RESEARCH REPORT
(FUNDAMENTAL RESEARCH GRANT SCHEME)

VALIDATING WORKPLACE SAFETY SCALE (WSS) AND ITS INFLUENCE ON WORKPLACE SAFETY SUSTAINABILITY IN THE HEALTH CARE SECTOR

CHANDRAKANTAN SUBRAMANIAM
FARIDAHWATI BINTI MOHD SHAMSUDDIN
MD. LAZIM BIN MOHD ZIN
HADZIROH BINTI IBRAHIM
HALIM BIN MAD LAZIM
FADZLI SHAH BIN AZIZ

COLLEGE OF BUSINESS
UNIVERSITI UTARA MALAYSIA
2014

DECLARATION

We hereby declare that the material presented is our own work, or fully and specifically acknowledge wherever adapted from other sources. We authorize Universiti Utara Malaysia to reproduce this report by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

Research Leader:

CHANDRAKANTAN SUBRAMANIAM _____

Co-Researchers:

FARIDAHWATI BINTI MOHD SHAMSUDIN _____

MD. LAZIM BIN MOHD ZIN _____

HADZIROH BINTI IBRAHIM _____

HALIM BIN MAD LAZIM _____

FADZLI SHAH BIN AZIZ _____

ABSTRACT

The present study attempts to provide empirical evidence on the relationship between the five facets of workplace safety scale and safety compliance behaviour. In adfdition the study examined the interaction effects of age on these workplace safety and safety compliance behaviour. The dimensions considered in the study are job safety, co-worker safety, supervisory safety, management safety, and satisfaction with safety programs/policies. Toward this end, a survey among 351 nurses working in Hospital Tuanku Fauziah Kangar, Hospital Sultanah Bahiyah Alor Setar, Penang General Hospital and Hospital Taiping was carried out. Self-reported measures were used to obtain data pertaining to workplace safety dimensions and safety compliance behaviour. The Partial Least Square (PLS) structural model analysis was used to ascertain the proposed relationships and it was found that only three dimensions of workplace safety (co-worker safety, supervisor safety and satisfaction with safety programs) were significantly related to safety compliance behaviour. Meanwhile, the results indicate that the moderating interaction of age on the relationship between job safety, co-worker safety, supervisor safety, management safety, and satisfaction on safety compliance behaviour were not significant. Discussion on the findings is highlighted, so as the implications for practice and future research. Limitations of the study are also offered.

Keywords: Workplace Safety Scale (WSS), Safety Compliance Behaviour, Healthcare Sector, Nurses

ACKNOWLEDGEMENTS

The preparation and completion of this research would not have been successfully carried out without the support of many people and organizations. First, we would like to express my gratitude to Ministry of Higher Education for granting the Fundamental Research Grant Scheme (FRGS), and to Universiti Utara Malaysia through Research Institute of Management Centre (RIMC) to administer and assist the research and funding. Secondly, we wish to thank the hospital Directors and Matrons namely Hospital Tuanku Fauziah Kangar, Hospital Sultanah Bahiyah Alor Setar, Penang General Hospital and Hospital Taiping for their endless support in the process of conducting our research.

Without forgetting the support and help from various organizations such as National Medical Research Registry (MMRR) and Institute of Medical Research (IMR) under the Ministry of Health (MOH) we would not have been able to get access to a wide range of data. Last but not least, I would heartedly convey our gratitude to our colleagues at UUM who made sure we completed this study.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.10 Background of the Study

This main purpose of this chapter is to introduce readers on the need to investigate safety climate in organisations as safety is one of the main concerns of employers in today's work environment. Toward this end, this chapter is organized as follows: first, it provides some background information on the status of occupational safety and health in Malaysia. As the present research was conducted in the health sector in particular government hospitals, a brief explanation of the research setting is offered. Next, an exposition on the existing gap in the current body of knowledge of safety practices is presented to justify empirically why such inquiry was needed. The chapter then proceeds by outlining the research questions need to be answered and the research objectives to be met. The scope of the present study then follows. Then, in what way the present study is expected to contribute to new theoretical knowledge and to practice is highlighted. Finally, the outline of the whole report is offered.

1.11 Occupational Safety and Health in Malaysia

In today's modern world, work complexity emerges from the need to cope with the impact of globalization, which has caused fast pace of changes and forced demand for a better quality of workforce and output produced. Implicit in this argument is that organizations need to be concerned about workplace safety as one of the ways in which their workforce can produce and offer services as demanded by the force of globalization. Countries like Malaysia are also not immune from such force. Hence, for Malaysia to be competitive in the world characterized by increasing uncertainty and fierce competition, safety at the workplace is not an issue that can be brushed aside, especially when new risks keep on materializing from a new technological development.

The statistics in Table 1.1 saliently suggest that, as years go by the number of industrial accidents reported in Malaysia tend to decrease. However, along with such figures, the number of fatalities recorded remains to be unprecedentedly high. These figures suggest that accident occurrences will lead to a distasteful consequence, especially if it involves loss of live.

Table 1.1

Total of Industrial Accidents and Fatal Accident, 2004-2008.

Year	Number of Accidents	Number of Fatal Accidents
2004	77,742	1291
2005	70,690	1292
2006	68,008	1337
2007	56,339	1169
2008	59,095	1301

Sources: Social Security Organization (SOCSO), Ministry of Human Resources (2008)

In Malaysia the improvement of safety at the workplace corresponds with the impetus of government enforcement on the legislation related to OSHA 1994 and the factory and Machinery Act 1967 (Aminuddin, 2007). Needless to say, it is obvious that the cost associated with accident occurrences is obtrusively high. It is estimated that the cost of accidents in Malaysia amounted to be over RM 1.9 billion in 1999 (Aminuddin, 2007). This is a gross amount calculated, encompasses both direct and indirect costs associated with accidents. However, the indirect cost related to accidents was estimated to be quadruple of this amount (Aminuddin, 2007). Moreover according to Corcoran (2002) when a serious accident occurs, there is usually great deal of activity associated with the accident.

There may be a slowdown in a production near the site of the accident, for instance. There also will be a need to replace the injured worker, at least temporarily, and there will be costs associated with the learning curve of the replacement worker. The supervisor and the accident investigation team probably will need to spend time conducting an investigation, and there will be a lot of time spent on the administration of paper work related to the accident.

From the statement above, we can assume that the cost related to the accident is prevalently surpassing what we always tend to perceive. Some accident costs might be overlooked by the management, which known as the hidden or indirect cost.

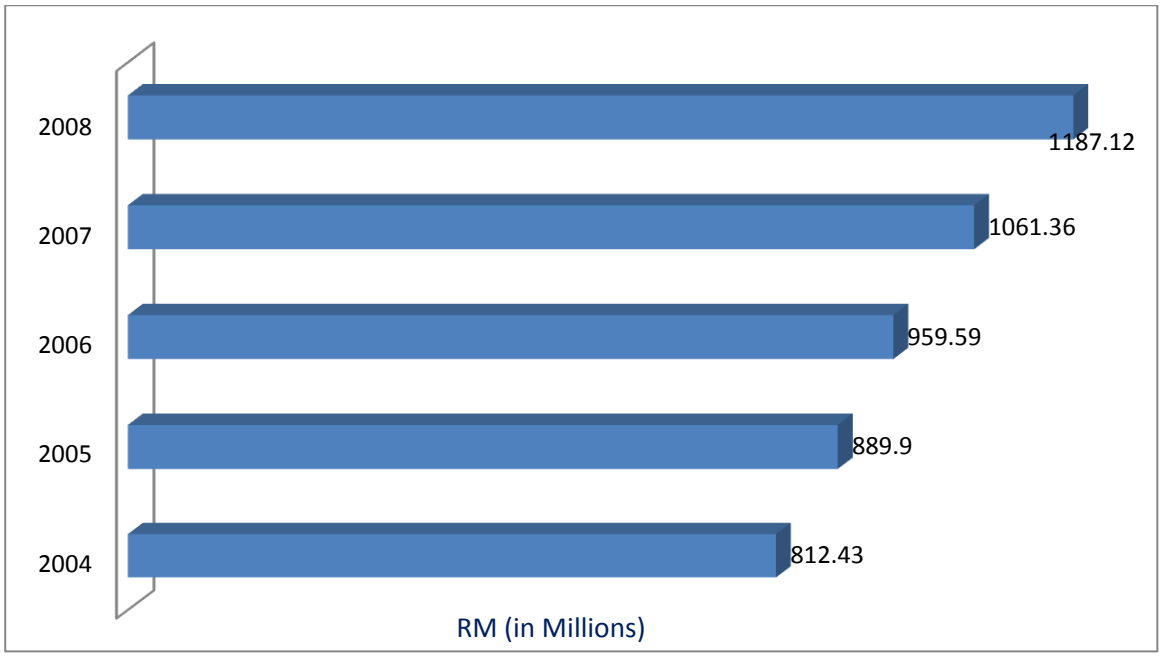

Figure 1.1

Total of compensation paid due to accidents, 2004-2008

Sources: ("Ministry of Human Resources, Malaysia,")

In 2008, the Social Security Organization (SOCSO) of Malaysia calculated an amount of approximately RM1187.12 million paid due to industrial accidents, as shown in Figure 1.1. The amount paid also steadily increasing by year from 2004 until 2008. This trend of figures might continue to escalate if no serious action is taken by the relevant parties. Government agencies such as the NIOSH, DOSH, and other NGOs have been working together to increase the safety awareness among employers, employees and societies at large. But despite the initiatives made, accidents are inevitable but preventable.

1.12 Occupational Safety and Health in the Healthcare Sector in Malaysia

As the present study was conducted in government hospitals in the northern region in Malaysia, it is apt that a description of the healthcare sector and the status of occupational health and safety in the sector is given. Injuries in the health care sector, predominantly due to patient handling, are a major occupational health and safety issue in Malaysia. According to Sadhra, Beach, Aw and Sheikh Hamed (2001), within the broad topic area "occupational health problems for specific occupational health groups and industries" the Ministry of Health participants identified healthcare workers as the top priority. Data show that in between 1985 and 1988 the number of cases of occupational diseases and injuries compensated within Malaysia rose by 40% (Sadhra et al., 2001). This may have been due partly to improved medical services and systems for administration of benefits, but probably also reflects a true increased incidence. This also indicates

significant under recognition and reporting of occupational injuries and diseases rather than their successful prevention.

In addition, the proportion of healthcare workers considering that their health and safety is at risk because of work they do is higher than the average across all sectors in Malaysia. This is because many of the settings in which health care workers carry out their jobs and the multiplicity of tasks they perform can present a great variety of hazards and risks. The range of risks faced by health workers includes biological risks such as infections caused by needlestick injuries, chemical risks including drugs used in the treatment of cancer and disinfectants, physical risks such as ionising radiation, and psychosocial risks including violence and shift work (Ministry of Health, 2010). For example, workers in the healthcare sector are at risk from needlestick because the worker may become infected by blood-borne pathogens (viruses, bacteria, fungi and other micro-organisms). In addition most workplace injuries in the health sector are musculoskeletal disorders caused by unsafe manual handling tasks such as lifting and moving people, as well as pushing and pulling patient trolleys and equipment.

In the health care sector, the use of chemicals is also seen in many medical care departments. In particular, personnel working in the Pathology, Pharmacology and Radiology Department are at a higher risk of exposure to chemicals. Poor management of chemicals can cause safety incidents such as spills, splashes, and explosions; and also lead to occupational diseases, poisoning and cancers (Ministry of Health, 2010). Furthermore, a study by

the Quality in Medical Care Section, Medical Development Division, MOH in 2007 which involved 134 hospitals showeed that only a small percentage of hospitals fulfilled all the safety and health criteria related to safe management of chemicals. The results are as follows:

- Provision of Personal Protective Equipment (PPE) (37.1%)
- Proper disposal of chemical waste (25.2%)
- Compliance to PPE usage (17.6%)
- Correct signage (17.6%)
- Proper storage of chemical (9.7%)

On the other hand, needlestick injuries (NSIs) are also among the important occupational injuries for heath care workers. Health care workers whor are exposed to needle in their clinical activities are at increased risk of acquiring needlestick which may lead to serious or fatal infection (Ebrahimi & Khosravi, 2007). The activities associated with the majority of needlestick injuries are injections, blood sampling, recapping and disposing needles and also handling trash. A study by Ebrahimi and Khosravi (2007) showed that 14.1% of incidence rate of cases of needlestick injuries amongst nurses in Malaysia in 2005. The main causes of injuries were recapping (32.4%), manipulating needles in patients (18.1%) and diposal to needle container (14.3%). As a whole, their study showed that nurses were exposed to the risk of needlestick injuries in their workplace. Thus the importance of intervention strategies to reduce needlestick related injuries must remain an essential facet of nursing safety and health programme.

The overall picture that emerges from all parts of the safety issues is one of increased health and safety risks in all occupations in health care oragnization. Occupational health and safety in the health care sector in particular are concerned with protecting the safety, health and welfare of people at work. In health care facilities, the workforce is a prime asset of the organization.

1.13 Problem Statement

Workplace safety is defined as a characteristic of a system with the goal of injury free operations that does not permit unacceptable risks to be undertaken (Flannery, Singer, & Wester, 2003). Around the world, the issue of workplace safety is a big concern both for organizations and government alike. Workplace deaths, accidents and injuries cause both financial harm and non-financial damage to the organization and the government. Not only organizations have to compensate the employees who are involved in accidents, injury or death, they also need to face public inquiry for any workplace mishaps that occur. When employees are permanently disabled as a result of the accidents and injuries at the workplace, the government has to take care of them in terms of providing the necessary medical attention and care, and when it happens, the nation has certainly lost valuable manpower to develop the country. All in all, workplace accidents, injuries and deaths are damaging to both the organization and the nation. As the losses involved are huge and costly, organizations should take necessary measures

on how to address this pressing issue that, if not, handled, can cripple the welfare of the country, not to mention, hurt the organization's bottom line.

The significance of workplace safety to the general well-being of organizations and the nation alike has also attracted scholarly attention to understand what workplace safety is and what they can do to assist organizations in addressing this workplace issue. Indeed, the literatures indicate a steady grow of empirical inquiries into the matter. But it is worth noting that the approach to understand this phenomenon among scholars and practitioners alike has shifted from being "reactive" to "proactive". Instead of taking necessary measures based on historical or retrospective data available in organizations such as lost time accidents and unpleasant accidents, now scholars and practitioners are more concerned about what can be done to prevent workplace accidents, injuries, and deaths from taking place by putting emphasis on safety audit or safety climate survey (Alhemood, Genaidy, Shell, Gunn, & Shoaf, 2004; Flin, Mearns, O'Connor, & Bryden, 2000). Through these audits or surveys, management of the organization will be able to know the state-of-the art safety practices currently being implemented and will be able to take proactive measures in preventing accidents from happening if the findings from the audit and the survey indicate that the organization is falling behind its safety efforts. Indeed Peterson (1989) notes that self-administered surveys can provide early warning signals to basic safety problems before they emerge as accidents and injuries.

Historically, accidents prevention program has been regarded as too costly for implementation by many organizations. However, in today's modern world the perception seems has changed paradoxically (Goetsch, 2008). The cost of accidents is no longer a mere issue that an organization can easily forgo and forget. As a result, working conditions for industrial employees today have improved significantly, as "the chance of a worker being killed in an industrial accident is less than half of what it was 60 years ago"(Peterson & Perry, 1999). It is thus safe to say that currently many organizations have understood the importance of providing safety and sound working place to their employees. It is no longer sufficient for organizations to simply adhere to rules and regulations but what is more important is the institutionalization of long-term safety approaches and programs. In other words, it is important for organizations to develop and implement good safety practices for their economic and social benefits.

Safety practices can be defined as the policies, strategies, procedures and activities implemented or followed by the management of an organization targeting safety of their employees (Vinodkumar & Bhasi, 2010). Safety practices are put in place to reduce occupational deaths, accidents and injuries. Implicit in the previous findings that safety practices could lead to positive consequences of reduced job-related anxiety and stress, and exposure to fewer environment hazards (Guastello, 1992) is employee compliance with safety behaviours. Indeed, Hayes, Perander, Smecko, & Trask (1998) found that perceptions of workplace safety issues are related to accident-related variables, such as accident rates, anxiety and employees'

compliance with safety behaviours. Whilst previous studies such as Hayes et al. (1998) have shown that safety practices can encourage employees to comply with safety procedures, more research needs to confirm and validate the findings.

In particular, according to Hayes et al. (1998), workplace safety practices can be reflected in the degree to which safety is perceived to being practiced in the accomplishment of job be it by the workers themselves, the co-workers, and the supervisor. It also reflected in the degree to which the management institute safety practices such as implementing safety training programs, and the degree that the members in the organization are satisfied with the safety program. As safety practices encompass various safety dimensions, it is important to investigate the differential effects of each practice in encouraging employees to be safe compliant at work. By doing so, not only can we enhance our understanding of the extent of safety practices can impact safety compliance behaviour, more effective measures can be implemented as organizations have scarce and limited resources.

Researchers have been interested to know whether different demographic factors make a difference on whether employees engage in safe behaviour at work. One of the demographic variables that have been considered is age. However, review of literatures suggests mixed findings on the role of age in determining safety behaviour of employees. For instance while Villanueva and Garcia (2011) found that risk of injuries increases with age, Salminen (2004) found the opposite result. He revealed that younger workers tend to

have higher injury rate. Siu, Phillips, and Leung (2003) found that accident rate is not related to age. Due to the mixed findings, more research works need to be investigated. It is argued that the mixed results available may suggest that the effect of age on safety behaviour may not be able to be discerned directly but its effect may be enhanced (or attenuated) when it interacts with some factors in the environment. It has been found that perceptions of workplace safety differ across employees (Clarke, 1999), and that there is evidence that older workers tend to have more positive attitudes toward safety than their younger counterparts (Siu et al., 2003). Hence, while positive perceptions of workplace safety have been found to be associated with safety behaviour (e.g. Clarke, 2006a; Clarke, 2006b; Cooper & Phillips, 2004; Lu & Tsai, 2010), the effects are argued to be enhanced amongst older employees. This is because in the words of Siu et al.(2003), “Older workers are more satisfied with and more likely to assess general housekeeping and checking of safety equipment … in a positive way, and perceive more encouragement and support from management/supervisor.” But to what extent such proposition is valid needs to be examined, and hence fill the existing gap in the body of knowledge.

1.14 Research Questions

Based on the above discussion above, the main research question is posed: “To what extent perceived safety practices in hospital organizations in Malaysia, as measured by the five safety dimensions of Hayes et al. (1998), is able to influence employees to engage in safety compliance behaviour?”

Additionally, the present study is interested to answer this question: “Do older workers who have positive perceptions and attitudes of workplace safety tend to comply more in safe behaviour at work?”

1.15 Research Objectives

In consistence with the above research questions, the present study aims to specifically meet the following research objectives:

a. To identify the level of safety performance among the nurses participated in the present study
b. To examine job safety influence on employee safety compliance behaviour.
c. To investigate co-worker safety influence on employee safety compliance behaviour.
d. To inquire supervisor safety influence on employee safety compliance behaviour.
e. To determine management safety practice influence on employee safety compliance behaviour.
f. To examine whether safety programs/policies implemented influence employee safety compliance behaviour.
g. To examine the moderating effect of age on the relationship between workplace safety practices and safety performance.

1.16 Scope of Study

To answer the research question and meet the research objectives, the present study was conducted at government hospitals in the northern region in Malaysia. The health care sector in general and hospitals are particular were purposely chosen because they are one of the social institutions of a country. As the well-being and health of the whole population depends largely on the services of healthcare providers, it is necessary that they behave in a safe manner while at work to provide quality healthcare services. Toward meeting the research objectives, in particular, a survey was carried out amongst staff nurses as they are the front-liners in hospitals who have to interact on a daily basis with patients and who are among the first individuals patients encounter when they seek for treatment at the hospital. The survey took about 8 months, starting from the month of March 2012 until the month of November 2012.

1.17 Significance of Study

The present study is significant both for theoretical development and practice. In the context of theory, the present study enhances the body of knowledge on safety practices by showing the importance of safety climate in producing positive behavioural outcomes i.e. safety compliance behaviour. To date, as very few have researched on the effect of safety practices on

safety compliance behaviour, the current study adds further to the theoretical understanding.

If the present study is able to demonstrate the significant impact of safety practices on safety compliance behaviour, then the findings are able to provide insight to managers in organizations (i.e. hospital management) into the need to enhance and nurture safety climate amongst hospital members so that they can internalize proper safety values and hence demonstrate appropriate safety behaviours while at work.

Finally, Research in the field of occupational health and safety is an essential aspect of the promotion of health at work especially in the health care organization. According to Gaba (2001), organizations that perform successfully under very challenging conditions, with very low levels of failure, are termed high-reliability organizations (HROs). Health care institutions strive to be HROs, providing technically challenging and intrinsically hazardous modalities of medical care to patients efficiently and safely. Thus, this research can provide essential information about occupational health priorities within health care organization in Malaysia especially in understanding the influence of workplace safety climate on workplace safety sustainability.

1.18 Outline of Report

This report is organized into five main chapters including the first chapter, which introduces the need to conduct a scientific inquiry into the role of safety climate in enhancing safety citizenship behaviour of employees at the workplace. The second chapter discusses the current state-of-the art of the literatures pertaining to safety issues. Here also the research hypotheses are formulated based on previous works. The third chapter deals with how the present study was practically implemented. Specific issues such as research design, population and sampling, data collection method, measurement used, and statistical analyses employed are explained in great detail. The fourth chapter presents the findings of the research based on the data collected among staff nurses at selected government hospitals. Finally, the fifth chapter interprets the findings in detail by relating them to theory and past research inquiries. Here also recommendations for future research and practice, and limitations of the present study are highlighted. Some concluding remarks are also offered to end the report.

CHAPTER TWO

LITERATURE REVIEW

3.0 Introduction

In the preceding chapter, a case has been raised on the need to examine safety practices in the healthcare sector amongst healthcare providers particularly nurses in Malaysia. As nurses are the backbone of the healthcare sector due to their sheer number and supporting role in delivering healthcare services to the public, it is imperative to assess their safety performance at work.

In this chapter, a current state of the art of the literatures on work safety practices and safety performance especially within the context of the healthcare sector is discussed. In particular this chapter seeks to highlight the empirical inquiries that have been conducted and the results found. In addition, as the present study is also interested to know whether safety performance will be different amongst nurses in different age groups, previous works on this issue will also be highlighted.

3.1 Work-related Injuries and Accidents

Work related injuries have generally been attributed to engineering aspects of occupational safety (Vredenburgh, 2002). Poor usage and handling of tools and machinery have been the main contributors. The technological

improvement and intensive efforts on engineering safety has progressively helped in improving workplace safety. According to Vrendenburgh (2002), engineering failure now accounts for only 10% of workplace accidents. Heinrich who introduces Domino Theory of Accident Causation noted that 88% of industrial accident originated from human errors (Goetsch, 2008). Therefore human plays a significant role in understanding workplace accidents and injuries (Donald & Young, 1996) and greater attention has now been directed to investigate the behavioural causes to workplace safety performance. Thus a proper understanding of the individuals who function independently or within groups operating in a technological system is increasingly becoming important in understanding workplace safety (Ali, Abdullah, & Subramaniam, 2009).

Studies have shown that the real cost of workplace accidents is many times more than what is spent on medical treatment, rehabilitation and compensation (MOSHPA, 2009). For example, in the United Kingdom figures show that the real cost is 8 - 36 times the visible actual cost. This real cost is in effect, unnecessary expenditure, and waste of financial and human resources. Thus, workplace accidents are costly to individuals, companies, and country as a whole. Reducing the rate of workplace accidents could conceivably save the nation billions of ringgit annually.

Researchers have examined the role of perceptions of workplace safety in understanding industrial accident process (Guastello & Guastello, 1988; Hayes et al., 1998; Murphy, Sturdivant, & Gershon, 1993). These studies in

general have revealed that perceptions of workplace safety issues are related to accident related variables such as accident rates, near misses, and employees' compliance with safety behaviours. The purpose of the proposed study is to validate and examine the perceptions of workplace safety issues and its influence on safety performance. The next section conceptualizes safety performance in greater detail.

3.2 Safety Performance

Researchers and practitioners alike are interested in investigating safety performance particularly factors that influence it as safety performance affects the bottom line of any organization. As highlighted earlier, organizations have to incur unnecessary costs that can be avoided should employees are more vigilant and comply with safety procedures and standards while at work.

The term safety performance is sometimes interchangeable with safety behaviour. When employees perform safely, it simply means that they engage in safe behaviours. Literatures have indicated at least two dimensions of safety behaviour. They are safety participation and safety compliance (or compliance with safe work behaviours). Safety participation refers to helping co-workers, promoting the safety program within the workplace, demonstrating initiative, and putting effort into improving safety in the workplace, safety compliance, on the other hand, refers to activities employees need to do in order to maintain workplace safety (Griffin & Neal,

2000; Neal, Griffin, & Hart, 2000). Such behavior includes maintaining the standard of work procedures and wearing personal protective equipment (Neal & Griffin, 2006). In other words, safety compliance deals with the efforts employees exert to maintain workplace safety by following the organizational safety based procedures, rules, and regulations (Griffin & Neal, 2000; Inness, Turner, Barling, & Stride, 2010; Neal et al., 2000; Schutte, 2010) argued that safety compliance refers to behavior focusing on meeting the minimum work safety standards, such as following safety procedures in the workplace. While safety participation is a voluntary behaviour not expected to be part of the work role, safety compliance, on the other hand, is a behaviour that is sanctioned and expected of employees (Jiang, Yu, Li, & Li, 2010). Viewed in this sense, both safety compliance and safety participation reflect the typology of work/job performance, as expounded by Borman and Motowildo (1993). In fact, Neil and Griffin (2006) developed safety performance model based on the models of job performance.

In the present study, the focus is given on safety compliance and not on safety participation even though it is acknowledged that safety performance encompasses both dimensions. This is because safety compliance is a formally sanctioned behaviour at work. This means that violations of safety standards and procedures tend to inflict more serious consequences to organizations both financially and non-financially. Furthermore, Clark (2006a) reported that failures to adhere to rules and regulations, follow safety procedures conscientiously and take precautions against hazards (such as

wearing personal protective equipment) are commonplace in many industries, such as mining and transport even though many violations seemed to occur to make work more efficient, quicker, or more convenient. In addition, violations of safety standards and procedures often entail punishment while compliance with safety may be rewarded (Reason, 1990). Next, a discussion on safety compliance is offered.

3.2.1 Approaches to Safety Behaviour

Due to the negative consequences workplace accident and injuries can bring to organizations, increasing attention has been paid by researchers to investigate safety performance and in particular its determinants so that prescriptive measures can be offered to improve safety at work.

To date, various theoretical frameworks and approaches have been developed to provide an account on this issue. At least three different approaches can be identified: technical approach, system approach, and management approach. All these approaches argue that occupational injuries and accidents are likely to occur due to different reasons in the work environment. The technical approach maintains that faults in the equipment and tools are likely to be the possible cause for employees to get injured and accidents at work. On the other hand, the system approach argues that the safety system as a whole is responsible in causing occupational injuries and accidents. Poor safety scheduling is an example that is argued to be a potential contributor to the lack of safety performance at work. The

management approach takes an entirely different approach in the sense that it maintains that occupational injuries and accidents are primarily caused by human errors and not so much by external faults or mistakes such as faulty tool/equipment or poor safety scheduling and policies.

The present study is located within the third approach because any faults in the equipment/tool or poor safety standards/policies in the organization ultimately rest on the people who make safety-related decisions at the workplace. While equipment/tool may be old and faulty, and safety standards/policies may be obsolete and not in keeping with the current development, they are in these states because management in the organization may not be vigilant and concerned enough to know what states they are in. In fact, studies have shown that 80% of occupational accidents and injuries could be attributed to human errors. Because management is ultimately responsible for ensuring safety and health at work, hence, they should put in place good safety culture and practices.

3.3 Workplace Safety Practices

Safety performance hinges considerably on workplace safety practices at work. Hayes et al. (1998) argued that workplace safety is a multi-faceted phenomenon as employees in an organization can form multiple attitudes on a given phenomenon as in the case of job satisfaction. They hypothesized that employees could have different perceptions with regards to the different aspects of safety at work. After reviewing the relevant literatures on

workplace safety, they proposed five different facets or dimensions of workplace safety. They are as follows:

1. Job safety – To what extent employees perceive that the job safe in the accomplishment of the job performance (i.e. whether the job is perceived to be dangerous, risky, scary etc.).
2. Co-worker safety – To what co-workers are perceived to practise safe work behaviour (i.e. whether they follow safety rules or encourage others to follow safety procedures)
3. Supervisor safety – To what extent supervisor is perceived to demonstrate safety-related behaviour at work (i.e. whether he/she enforces safety rules, acts on safety suggestions etc.)
4. Management safety – To what extent management is perceived to develop safety culture at work (i.e. whether it rewards safe behaviour, provides safe working conditions etc.)
5. Satisfaction with safety program – To what extent safety program conducted is perceived to satisfactory (whether the safety program is perceived to be unclear, worthwhile, important etc.).

The five different facets of workplace safety were then incorporated into a scale to measure workplace safety, which is called Work Safety Scale (WSS). In essence, the five different facets of workplace safety reflect the degree of workplace safety practices carried out in organizations. In general, safety practices have been defined as the policies, strategies, procedures and activities implemented or followed by the management of an organization targeting safety of their employees (Vinodkumar & Bhasi, 2010). According to

Lu and Tsai (2010), safety practices reflect the climate and culture of safety. In a similar vein, Griffin and Neal (2000) argued that employees' perceptions of the policies, procedures, and practices relating to safety comprise the safety climate. Consistent with the others, Zohar (2000) referred to safety climate as a particular aspect of organizational climate that focuses on those shared perceptions of organizational policies, procedures and practices that serve as an indicator of the importance of employee safety and health.

Even though some scholars tend to differentiate between safety climate and safety culture, citing the two constructs as being conceptually distinct but are related because safety culture is considered to be a more complex and enduring phenomenon than safety climate, which is, to some extent, presumably linked to national and societal culture (Høivik, Tharaldsen, Baste, & Moen, 2009; Mearns & Flin, 1999), many scholars have used the terms interchangeably. However, their article to differentiate safety culture from safety climate, Mearns and Flin (1999) concluded that safety climate is a sub-set or sub-component of safety culture and hence the two terms should be treated as distinct. They asserted that:

The term "safety climate" best describes employees' perceptions, attitudes, and beliefs about risk and safety, typically measured by questionnaire surveys and providing a "snapshot" of the current state of safety. "Safety culture" is a more complex and enduring trait reflecting fundamental values, norms, assumptions and expectations, which to some extent reside in societal culture. The expression of these "cultural" elements, perhaps, can be

seen through safety management practices which are reflected in the safety climate.

The view that safety climate is subsumed under safety culture is also shared by many other scholars, as reported by Cooper and Phillips (2004). Taking cognizant of the need to differentiate safety culture from safety climate because the latter operates on the individual level while the former on the group/organizational level, the present study strictly uses the term safety climate to represent the safety practices at work.

3.4 Safety Practices and Safety Performance: Empirical Evidence

Due to the importance of workplace safety, it is not surprising that many empirical works have been devoted to this topic. At least two general streams of research can be identified: those that are interested in finding out the role of safety climate/practices in shaping safety performance/behaviour at work, and those that are keen to examine the factors that shape and influence safety climate or safety culture. In addition to these streams, some researchers seek to assess and evaluate the effectiveness of safety interventions or programs instituted. The present study is located within the stream of research in that it aims to look into the role of safety practices in influencing safety behaviour, and whether safety behaviour/performance is different amongst employees of different age groups. By doing so, the present study adds to the existing safety literatures.

Many scholars have argued on the role of safety climate (and hence safety practices) in enhancing safety performance at work. According to Clark (2006b), safety climate provides guidance on suitable organizational behaviour in that a more positive climate encourages safe behaviours through organizational rewards (e.g., recognition and feedback for making safety suggestions), while a more negative safety climate reinforces unsafe behaviours by removing incentives to improve safety (e.g., prioritizing production over safety). Indeed, the theoretical proposition on the influence of safety climate on safety behaviour has received overwhelming empirical support across different organizational settings such as off-shore industry (e.g. Høivik et al., 2009; Mearns, Whitaker, & Flin, 2003), manufacturing (e.g. Cooper & Phillips, 2004), construction (e.g. Larsson, Pousette, & Törner, 2008; Siu, Phillips, & Leung, 2004), and service sector (e.g. Cloutier, David, & Duguay, 1998; Sinclair et al., 2003). Similar results were also reported in healthcare settings (e.g. Rogers, Hwang, Scott, Aiken, & Dinges, 2004; Scott, Rogers, Hwang, & Zhang, 2006; Singer, A. Falwell, D. Gaba, & Baker, 2008). In a meta-analytic study involving 32 scientific inquiries, Clark (2006a) found support for the link between organizational safety climate and employee safety performance.

Previous studies also seem to provide overwhelming evidence on the role of safety climate on safety compliance behaviour. For example, Griffin and Neal `(2000) conducted a study to examine the relationship between safety climate and safety performance (safety compliance and safety participation among 326 employees in three Australian manufacturing organizations. They

observed that safety climate affected positively safety compliance and safety participation. Similar result was also obtained by Neal et al. (2000) in which they found that safety climate had an effect on safety compliance and safety participation. Pedersen and Kines (2011) also reported similar finding in their study on safety motivation and safety performance (safety compliance and safety participation) among 532 workers of 22 small, medium, and large metal or wood manufacturing enterprises in Denmark. In a related study, Vinodkumar and Bhasi (2010) found safety compliance and safety participation to have a positive significant relationship with safety knowledge and safety motivation. Clarke (2006b) conducted a study to examine relationships between safety climate and safety performance (participation and compliance) using occupational accidents and injuries as moderators. The results supported the hypotheses linking safety climate to employee safety compliance and participation, with the latter demonstrating a stronger relationship.

Safety climate in the healthcare setting has also been found to enhance safety behavior. Within the context of this setting, patient safety is given paramount importance as patients are the contact customers healthcare workers have to interact with almost on a daily basis. In their survey among 91 hospitals in the United States, Singer et al. (2008) found that hospitals with better safety climate overall had lower relative incidence of Patient Safety Indicators (PSIs), as did hospitals with better scores on safety climate dimensions. They also observed that frontline personnel's perceptions of better safety climate predicted lower risk of experiencing PSIs. In a recent

study by Agnew, Flin, and Mearns (2013) in acute hospitals in Scotland, they found that hospital safety climate scores were significantly correlated with clinical workers' safety behavior and patient and worker injury measures, although the effect sizes were smaller for the latter. They also revealed that perceptions of staffing levels and managerial commitment were significant predictors for all the safety outcome measures. Both patient-specific and more generic safety climate items were found to have significant impacts on safety outcome measures. Hansen, Williams, and Singer (2011) found a significant positive association between lower safety climate and higher readmission rates for acute myocardial infarction (AMI), and heart failure (HF). Similar findings that hospital safety climate reduces injuries and enhances safety performance were also reported elsewhere (e.g. Chowdhury & Endres, 2010; D.A. Hofmann & Mark, 2006; Katz, 1982).

In an earlier study, Gershon, Conrad, Murphy, Vlahov, and Kelen (1995) aimed to assess self-reported levels of compliance amongst 1716 hospital-based healthcare workers in the United States. Overall compliance was defined as "always" or "often" adhering to the desired protective behavior, and 11 different items composed the overall compliance scale. Compliance rates varied among the 11 items from extremely high for certain activities (e.g., glove use, and disposal of sharps) to low for others (e.g., wearing protective outer clothing, and wearing eye protection). They found that compliance was strongly correlated with several key factors: (1) perceived organizational commitment to safety, (2) perceived conflict of interest between workers' need to protect themselves and their need to provide

medical care to patients; (3) risk-taking personality; (4) perception of risk; (5) knowledge regarding routes of HIV transmission; and (6) training in universal precautions. Compliance rates were associated with some demographic characteristics: female workers higher overall compliance scores than did male workers, and overall compliance scores were highest for nurses, intermediate for technicians, and lowest for physicians.

As mentioned earlier, since safety climate is reflected partly in safety practices in organizations, the following explain how such practices could influence employees' safety behaviour. Specifically, the five facets of workplace safety practices, proposed by Hayes et al. (1998) are invoked.

3.4.1 Job Safety and Safety Performance

The first facet of workplace safety is job safety. Extrapolating from the definition of job-risk perception by Basha and Maiti (2013), job safety refers to employee's perception about the degree that their job is safe. Risk is inherent in all types of jobs; however, some jobs tend to be riskier than the others. People who are aware of the job risks tend to be more careful and vigilant in the course of accomplishing their job. This is because people by nature are hedonistic; they will avoid pain as much as possible as pain is an uncomfortable experience. Hence, in the context of workplace safety, when employees perceive that their job involves risk, they more are likely to engage in and comply with safety behaviour at work. In other words, the

more employees perceive their job as being unsafe, the more likely they will comply with safety behaviour while at work (Cox & Blake, 1991).

Empirical evidence seems to point to the role of job risk and safety. For instance, Arezes and Miguel (2008) found that, on average, workers reported the use of hearing protection devices (HPDs) during almost half of the time that they were exposed to high noise levels among a sample of 516 industrial workers in Portugal. Basha and Maiti (2013) found that job-risk factors significantly associated with injury experience. In a study by Caponecchia and Sheils (2011) in a sample of 175 Australian construction workers, they found that Australian construction workers showed significant levels of optimism bias, the belief that negative events are less likely to happen to oneself than to others, in relation to health and safety hazards in their workplace such as falling from heights or being struck by materials. In others words, because employees tend to perceive that injuries will not likely to happen to them, they tend to minimize the effects of job risks on safety behaviour. Similar finding was also reported by Rundmo (1999) where he observed that risk perception was related to risk behaviour. Lund and Rundmo (2009) in their study to examine cultural differences in risk perception and attitudes towards traffic safety and risk, taking behaviour in the Norwegian and the Ghanaian public, found that in general perceived risk and attitudes significantly predicted risk behaviour and accidents/collisions.

Within the healthcare setting, injuries among healthcare workers are a common phenomenon especially back and sharp injuries (Boden et al.,

2011). Nsubuga and Jaakkola (2005) found that 57% of the nurses and midwives in the sub-Saharan Africa in their study had experienced at least one needle stick injury in the last year. Various factors have been cited to affect injuries in this sector. Scott et al. (2006) found that among the sampled critical care nurses in the United States, the majority consistently worked longer than scheduled and for extended periods. They further revealed that longer work duration increased the risk of errors and near errors and decreased nurses' vigilance. Similar findings were reported by Rogers et al. (2004). Based on the logbooks completed by 393 hospital staff nurses, they revealed that participants usually worked longer than scheduled and that approximately 40 percent of the 5,317 work shifts they logged exceeded twelve hours. The risks of making an error were significantly increased when work shifts were longer than twelve hours, when nurses worked overtime, or when they worked more than forty hours per week.

3.4.2 Co-worker Safety and Safety Performance

It is generally argued that co-worker attitude and behaviour have a significant bearing on how employees behave at work, consistent with the main proposition of social learning behaviour by Bandura (1977). In essence, social learning theory argues that employees learn how to behave by observing what other people in the same environment are doing which include co-workers and their supervisors/leaders. In the context of safe work behaviour, a similar argument can be made in that employees will behave safely when they learn that other people who are doing so will avoid from

getting injured or accident while at work. In this context, co-workers are seen as a significant referent other from which employees learn what should and should not be done. The idea of imitating co-worker behaviour is grounded on the need to be socially accepted by others within a group. Hence, the employees learn through socialization process to institutionalize the group norms in order to be accepted. According to Jiang et al. (2010), descriptive norms, referring to what is done, are beliefs and perception about what is actually done by most others in one's social group, determine colleagues' safety beliefs, habits and behaviour, which are likely to play important role in workplace safety. Furthermore, in the context of workplace safety, the idea that co-workers can influence other people's safety behaviour signifies the role of co-workers as an important agent of safety climate at the group level (Brondino, Silva, & Pasini, 2012). This is because according to Roberts and Geller (1995), a person's co-workers are the ones most likely to be present when a work process warrants certain safety precautions.

Indeed, researchers have found empirical support for the assertion that co-workers safety behaviour affects employee safety behaviour and performance (e.g. Brondino et al., 2012; Fugas, Meliá, & Silva, 2011; Jiang et al., 2010; Kapp, 2012). For instance, the study involving 991 blue collar workers in metal and mechanical sector companies in the region of Veneto, Italy by Brondino et al.(2012) found that co-worker safety climate had a stronger role than supervisor's role in influencing safety climate at the individual and group level. Fugas and his colleagues (2011) in their longitudinal study involving 132 workers in a passenger transportation

company supported the link between co-workers' descriptive safety norms (at Time 1) and proactive safety practices and behaviour (at Time 2).

In addition to being a role model for others, co-workers also provide social support to others. In the context of safety, this means that co-workers will encourage other employees to behave safely at work and to provide guidance to the others. They will also watch other employees' back to ensure that everyone will be safe while at work. According to Brondino et al. (2012), co-workers offer information, show behavioural support for desired practices while discouraging others and might shape their co-workers' roles through offering lateral mentoring. The concept in which co-workers provide support for each other with regards to safety issue is called active caring, which refers to "an ultimate goal in occupational safety, namely that employees care enough about the safety of their co-workers to act accordingly. In other words, employees actively caring for safety would continually look for environmental hazards and unsafe work practices and implement appropriate corrective actions when unsafe conditions or behaviours are observed" (Roberts & Geller, 1995). Burt, Sepie, and MacFAdden (2008) noted that actively caring might overcome (or perhaps supplement) the need for management to constantly monitor safety related behaviour, by employees taking this role/responsibility to help ensure their co-workers' safety.

3.4.3 Supervisor Safety and Safety Performance

In addition co-workers, supervisor's behaviour also plays an important factor in determining employee behaviour and attitude at work in that supervisors play a leadership role at work. Within the safety literature, leaders that are concerned about the safety of their workers could reduce occupational injuries and accidents at work because leaders actively communicate the importance of safety at work (Kelloway, Mullen, & Francis, 2006) and concerning organizational priorities on workplace safety (Kozlowski & Doherty, 1989; Zohar, 2000). Furthermore, because leaders serve as an important role model to employees by behaving safely themselves, employees tend to imitate such behaviour, consistent with social learning theory of Bandura (1977). In addition, it has been revealed that supervisor support enhanced employees' willingness to report injuries and near misses (Lauver, Lester, & Le, 2009). Mullen (2005) also found that management openness was related to employee willingness to raise safety issues.

Basing on general leadership domains of transformational and transactional leadership, scholars have identified safety-specific transformational style and safety-specific transactional style (Kapp, 2012; Zohar, 2002). According to Dahl and Olsen (2013), "safety-specific transactional leadership is characterized by the establishment of appropriate safety goals, by monitoring workers' performance in relation to those goals, and by rewarding or correcting behaviour which sustains or improves safety performance … safety-specific transformational leadership is characterized by leaders who

challenge workers to achieve exceptional safety standards, who display concern for the safety and well-being of employees, who challenge the workers to develop improved practices for solving safety-related problems, and who stand out as role models for their staff by working in a safe way themselves".

Previous studies have found empirical support for the effect of safety-specific transactional and safety-specific transformational leadership styles on safety compliance. For instance, Kapp (2012) found that greater levels of transformational and contingent reward leadership were both associated with greater levels of safety compliance and safety participation behaviour. Similar finding was also reported by Mullen, Kelloway, and Teed (2011) on a sample of 241 young workers and in a sample of 491 older workers, who were long-term health care employees. They found that a transformational safety-specific leadership style was associated with greater safety compliance and safety participation in employees. But they also observed that the predictive effect of transformational style of leadership on safety participation and safety compliance was attenuated or reduced when leaders also displayed passive leadership with respect to safety outcomes.

Dahl and Olsen (2013) persuasively argued that despite the importance of safety-specific leadership styles in influencing safety behaviour, more importantly leaders should be involved directly in promoting workplace safety and in enhancing safety performance at work. They maintained that supervisors, who are close to the front end of the work and have a

cooperative and participative relationship with their subordinates and the work that they perform, will be able to promote workplace safety. Reviewing the literatures, they further argued that leaders who are involved in safety matters will enable them to reveal unsafe work practices. According to Dahl and Olsen (2013), leadership involvement is of significant importance for safety because it creates a context where surprises are more likely to be surfaced and corrected before they grow into problems.

To test their theoretical proposition, Dhal and Olsen (2013) conducted a study based on a multi-sample survey of employees working for a Norwegian oil company on 28 different offshore installations on the Norwegian Continental Shelf (NCS). They aimed to examine how workers' perception of leadership involvement in daily work operations affects the level of safety compliant behaviour among workers employed on offshore platforms operating on the NCS. SEM analyses revealed that leadership involvement in daily work operations has a significant positive influence on the level of safety compliance on offshore platforms. They concluded that "the degree to which leaders participate in the planning and preparation of work, follow up the execution of the work, and contribute to good cooperation among team members has a positive effect on safety compliance" (p. 24).

But Kelloway et al. (2006) noted that some leaders may not be actively involved in the promotion of safety. They refer to these leaders as passive leaders, who are essentially poor leaders. In the context of safety, passive leaders are those who ignore safety concerns but who do not blatantly

disregard the safety of their employees. In their study to examine the effect of passive leadership on safety climate, they found support that passive leadership accounted for significant incremental variance—beyond that explained by transformational leadership—in safety consciousness, safety climate, safety-related events, and injuries. They also observed that safety-specific passive leadership had negative, rather than null, effects on both safety consciousness and safety climate, and hence injuries.

3.4.4 Management Safety and Safety Performance

It has been generally agreed that management has an important role to play in the institution and development of safety climate (Rundmo & Hale, 2003; Yule, Flin, & Murdy, 2007). This is because management attitudes and behaviour toward safety permeate down through the organisation to the workforce (Mearns et al., 2003). According to Kirwan (1998), safety management relates to the actual practices, roles and functions associated with remaining safe (Kirwan, 1998). But what are the actual practices of management safety? Based on the relevant literatures, various scholars have attempted to delineate such practices. For instance, (Vredenburgh, 2002) identified six management practices i.e. rewards, training, hiring, communication/feedback, participation, and management support from various safety literatures. Within the trucking industry, Arboleda, Morrow, Crum, & Shelley (2003) identified safety training, driver scheduling autonomy, opportunity for safety input, and management commitment to safety. (Mearns

et al., 2003) identified that the following themes to reflect the ideal management practices:

1. Genuine and consistent management commitment to safety, including: prioritization of safety over production; maintaining a high profile for safety in meetings, personal attendance of managers at safety meetings and in walkabouts; face-to-face meetings with employees that feature safety as a topic; and job descriptions that include safety contracts.
2. Communication about safety issues, including: pervasive channels of formal and informal communication and regular communication between management, supervisors and the workforce.
3. Involvement of employees, including empowerment, delegation of responsibility for safety, and encouraging commitment to the organisation.

Previous works generally found support for the role of management safety practices in enhancing safety performance but with differential impacts. For instance, Vredenburgh (2002) attempted to determine to what extent these practices predict employee injury rates. To do so, she carried out a study among 62 risk managers in various hospitals located in several states in the United States. She revealed that overall the management practices reliably predicted injury rates. She further observed that the consideration of safety performance in the selection of employees was found to be a significant predictor of injury rates. Based on the findings, she concluded that when organizations take proactive measures to protect their employees, the

company derives a financial benefit in reduced lost time and workers compensation expenses.

In a different study that examined how safety training, driver scheduling autonomy, opportunity for safety input, and management commitment to safety, which reflect management safety practices, influence individuals' perceptions of safety culture within the trucking industry, Arboleda et al. (Arboleda et al., 2003) found that driver fatigue training, driver opportunity for safety input, and top management commitment to safety were perceived to be integral determinants of safety culture in different hierarchical groups (i.e. drivers [lowest hierarchical level], dispatchers [medium hierarchical level], and safety directors [highest hierarchical level].

In a safety climate surveys conducted on 13 offshore oil and gas installations in separate years (N=682 and 806, respectively), with nine installations common to both years, Mearns, Whitaker, and Flin (2003) found significant associations between management practices and climate scores with official accident statistics and self-reported accident involvement. Based on their findings, they recommended that (p. 669): (1) ambitious auditing goals and their achievement in the area of health and safety need to be emphasised within the safety management system; (2) the approach to safety management should include areas of health and worker well-being that extend outside the workplace. Employee occupational health plans and health programmes fall within this category; and (3) commitment by senior

onshore personnel taking the form of regular visits offsite to discuss safety and talk with workers may improve safety performance.

One main feature that characterizes management safety practices is management commitment. According to Zohar (1980), the management commitment and attitude towards safety was a prerequisite of successful initiatives aimed at improving the state of safety in industrial organisations. The importance of management commitment to safety is evidenced from previous works. For instance, Diaz and Cabrera (1997), who reported that company safety policy (e.g. feedback on performance, management commitment, assignation of funds and resources to safety areas, and the importance of safety training) were deemed to be the most important factor in developing safety climate. In another study by Rundmo and Hale (2003) on 210 respondents who were presidents, vice-presidents, general managers, plant managers, and market managers employed by Norsk Hydro, they found empirical evidence that managers' commitment to safety (i.e. attitude) significantly influenced safe behaviour working practices. The findings supported previous works that indicated that management safety comment and involvement was important to predict workplace safety (Cohen, Smith, & Cohen, 1975; Hale, Heming, & Carthey, 1997; Rundmo, 1992; Simonds & Shafai-Sahrai, 1977; Smith, Cohen, Cohen, & Cleveland, 1978).

As indicated by Diaz and Cabrera (1997), management safety practices fall within the broad term of company safety policy. One of the practices include the institution of safety incentive to encourage and promote workplace safety

and hence safety behaviour amongst employees. Safety incentive is broadly defined as reward techniques used to improve health and safety results, which are designed to reinforce safe behaviour and counter the natural incentive to unsafe behaviour (Haines, Merrheim, & Roy, 2001). In addition to reward, safety incentives also include the use of feedback to improve workplace safety. Studies have generally concluded that the use of safety incentives and feedback could reduce workplace accidents by preventing unsafe behaviours (e.g. Alavosius & Sulzer-Azaroff, 1986; Austin, 2003; Hinze, 2002). In particular, Hinze (2002) found firms that use incentives with greater success tend to use incentives of low value, but give the awards on a frequent basis. They also emphasize the recognition that goes with the receipt of incentives, and they tend to award entire construction crews for safe performance, rather than individual workers. In general, safety incentive and feedback fall within behavioral-based safety intervention designed to ensure workplace safety (Goodrum & Gangwar, 2004).

Other researchers have also found positive effects of specific management practices such as employee participation (e.g. Cheyne, Oliver, Tomas, & Cox, 2002; Gevers, 1983; Johnstone, Quinlan, & Walters, 2005), and communication and feedback (e.g. Cigularov, Chen, & Rosecrance, 2010; Parker, Axtell, & Turner, 2001; Vinodkumar & Bhasi, 2010).

3.4.5 Satisfaction with Safety Programs and Safety Performance

Even though the relationship between satisfaction and performance is still debatable, many still are of the opinion that satisfied employees tend to perform better than those who are not satisfied. Similarly, those who perceive safety programs and interventions instituted by management are effective and useful in reducing work-related accidents and injuries, they are likely to institutionalize the values and philosophy embedded in them, which will consequently lead to enhanced safety behaviour. Satisfactory and effective safety programs, in other words, help reinforce their understanding on the need to behave safely at work, as shown by previous works. For instance, in a longitudinal study among 374 plant personnel of a packaging production plant in the USA, Cooper and Phillips (2004) found empirical evidence that perceptions of the importance of safety training were predictive of actual levels of safety behaviour.

Based on relevant theories and previous works, the above arguments have shown that safety climate as reflected in safety practices could influence employees' safety behaviour at work. In particular, the above studies seem to indicate that the more favourable safety practices are perceived by employees, the more likely they will engage in and comply with safety behaviour. Hence, consistent with the above expositions, the following hypothesis and its sub-hypotheses are offered:

H1: Workplace safety practices will enhance compliance with safety behaviour.

H1a: Job safety will increase compliance with safety behaviour at work.

H1b: Co-worker safety practices will increase compliance with safety behaviour at work.

H1c: Supervisor safety practices will increase compliance with safety behaviour at work.

H1d: Management safety practices will increase compliance with safety behaviour at work.

H1e: When employees are satisfied with safety programs instituted, they will comply with safety behaviour at work.

3.5 Age and Safety Performance

It has been argued that, theoretically speaking, due to the differences in their background, different employees may exhibit different safety behaviours at work Geller (2004); Geller & Wiegand, (2005); Williams, (2000); Zhou et al., (2008). The role of demographic background of employees in safety performance has received particular attention because the effectiveness of safety interventions in reducing occupational injuries and accidents seems to hinge upon this factor (Arezes & Miguel, 2008; Lund & Rundmo, 2009). One of the demographic issues that have caught the attention of researchers is age of employees. In the present study, the main question that needs answering is that: “Do older workers who have positive perceptions and

attitudes of workplace safety tend to comply more in safe behaviour at work than their younger counterparts?”

So, what is the relationship between ageing and safety performance? Literatures indicate two main schools of thought on this issue. On one hand, some scholars seem to be of the opinion that as one gets older, one tends to be more accident prone. Many factors have been cited for such possibility. As one gets older, the physical and cognitive abilities tend to deteriorate. Older people also have poor eyesight in comparison to their young counterparts, which reduces their visibility in performing certain jobs. In other words, there is a pattern of functional loss as one ages. According to a study by Seidel, Habel, Kirschner, & Derntl (2010), locomotion was the first ability to be lost, followed by reaching, thinking, hearing, vision, and dexterity.

On the other hand, others take a different perspective on the relationship between age and safety behaviour. They maintain that whilst the main idea that that as one gets older, one’s health will deteriorate remains valid, the thesis that old people tend to engage in dangerous work behaviours is less valid and untenable because it seems to be built on stereotyped assumptions about older people. In her study on age-related accidents among assembly male workers, Laflamme (1996) found that younger assemblers (16-24 years) were the ones for whom consistently high accident ratios were recorded, suggesting that older workers tend to possess compensatory ability in dealing with accidents than to a deterioration in work capacity.

Whilst both arguments may have some validity in them, the empirical evidence suggests that the effect of age on accidents and injuries tend to be more complex than it was originally thought. But, overall, the evidence seems to indicate that while injury rate decreases with age, the severity of the injuries incurred appears to increase. Such conclusion was drawn by Folkard (2008), who reviewed literatures on the effect of shift work, aging, and performance. He further concluded that older workers may be less able to both maintain their performance over the course of a night shift and to cope with longer spans of successive night shifts, indicating that it is likely that older workers may pose a greater risk on the night shift in terms of both injuries and accidents. Erkal (2010) also seemed to corroborate the general conclusion when he showed that elderly people may have greater risks of falling at home due to unsafe behaviours than their younger counterparts such as hurrying to answer the phone or door or climbing a chair/ladder to reach items in high places (Erkal, 2010). Similar observation was also reported by Cloutier et al. (1998), when they revealed a decrease of occurrence rate with age among nurses and food services workers but an increase in accident severity with age among food services workers but not nurses.

However, Basha and Mitai (2013) found that the demographic variables age and total experience were not significantly associated with job-risk perception, contrary to their expectation. Siu et al. (2003) in their study on construction workers in Hong Kong also found no effect of age on accident rates. However, they revealed that occupational injuries were related to age

in a curvilinear manner, with injuries at first increasing with age, then decreasing.

Despite the mixed findings, it is possible to hypothesize that safety compliance tend to be different for different employees who perceive favourably the safety practices implemented in organizations. This is because Cooper and Phillips (2004) found that significant differences in perceptions in management attitudes, management action, and safety training emerged between young and old groups of workers, and the perceptions affected their safety behaviour. They concluded that behavioural safety interventions exert positive effects upon the perceptions of older workers yet have little impact upon those in the youngest age group. Furthermore, as shown by Lund and Rundmo (2009), in Norway, adolescents were less sensitive to risks and more willing to take risks compared to adults. Siu et al. (2003) also revealed that older workers exhibited more positive attitudes to safety than their younger counterparts.

Similar finding was reported by Gyekye and Salminen (2009). They investigated whether age can account for differences in safety perception, job satisfaction, compliance with safety management policies, and accident frequency. Participants were 320 Ghanaian industrial workers categorized into four age groups: 19-29 years; 30-39 years; 40-50 years; and 51 years and above. Workplace safety perception was assessed with Hayes et al., (1998) 50-item Work Safety Scale (WSS). ANOVA was used to test for differences in the mean scores of the four groups. They found a positive

association between age and safety perception. Older workers had the best perceptions on safety, indicated the highest level of job satisfaction, were the most compliant with safety procedures, and recorded the lowest accident involvement rate. Trankle, Gelau, & Metker (1990) found that younger males judged the risk of dangerous traffic situations as lower compared to older males.

Based on the above arguments, the following hypothesis is offered:

H2: Employees in different age groups tend to comply with safety behaviour at work when they perceive favourably that the workplace safety practices are put in place.

3.6 Research Framework

Based on the above discussion, Figure 2.1 illustrates the research framework, encompassing the relationships between safety practices, safety performance, and age, as the moderating variable.

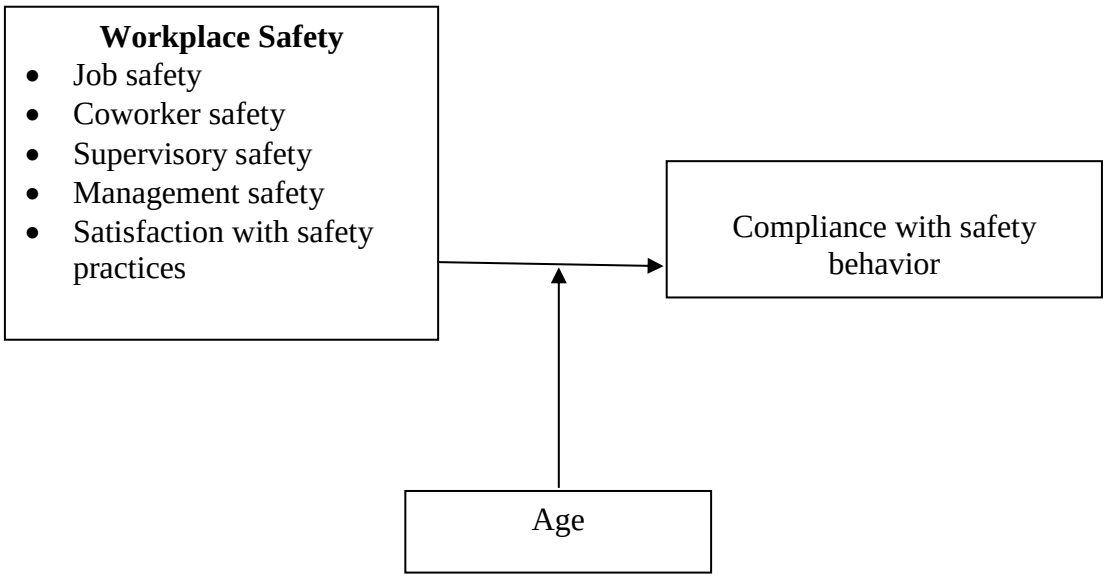

Figure 2.1

Research framework

To summarize, Figure 2.1 shows the hypothesised relationships among the variables in the study. Workplace safety practices such as job safety, co-worker safety, supervisory safety, management safety, and satisfaction with safety practices are hypothesised to enhance nurses' compliance with safety behaviour while at work. In other words, the better the implementation of safety practices at work, the higher the likelihood that nurses will engage in safety behaviour. In addition, it is also hypothesized that nurses of different age groups will behave differently in their compliance behaviour when the safety practices are in place.

3.7 Summary

This chapter has highlighted the existing literatures on safety practices and safety performance. Generally speaking, previous works have overwhelmingly shown that good safety practices, which make up safety climate, could enhance safety performance. In the context of present research, safety performance is manifested in terms of safety compliance. The chapter has also reviewed existing literature on the effect of age on safety performance, and the empirical evidence appears to be mixed. While some studies revealed that older employees tend to behave less safely than younger ones, others provided a different observation. Older employees were either found to demonstrate safer behaviour or they were no different from their younger counterparts in behaving safely while at work. But in general, because safety performance tends to be different amongst employees, it is apt to consider whether nurses of different groups exhibit differently safe work behaviour when safety practices are put in place.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The previous chapter has discussed related literature on safety performance and the dimensions of workplace safety scale practices. This chapter covers the research methodology and procedure undertaken by this study. This includes theoretical framework, underpinning theory, data collection, research instruments, population, sample, sampling technique, and data analysis.

3.2 Theoretical Framework

Review on literature indicates that workplace safety practices could be expected to explain safety performance. For example, previous attempts by Cooper and Phillips (2004); Diaz and Cbrera (1997); Hofmann and Steze (1996); Guestello, (1992); Gyekye (2005); Probst (2002) have suggested that safety practices are related to safety performance.

The present study also attempts to investigate the moderating effects of age on safety performance. Previous studies have found age to moderate the

relationship between proactive personality and training (Bertolino, Truxillo, & Fraccaroli, 2011), and procedural justice and turnover (Bal, Lange, Ybema, Jansen, & Velde, 2011). Age is postulated to have some impact why some employees adhere to workplace safety. The rationality thinking that blend with age would then help to explain why certain groups are more adhering to workplace safety. In the present study age is examined as a moderator of the relationship between dimensions of workplace safety practice and safety performance. These empirical evidences serve as a foundation for the research framework.

A model illustrating the relationships between dimensions of workplace safety practices and safety performance is presented schematically in Figure 3.1. The figure presents an overview of the model to be tested in this study. The dimensions of workplace safety practices of the present study comprise of job safety, co-worker safety, supervisory safety, management safety and satisfaction with safety practices. The dependent variable of the present study is safety performance. It is also hypothesized that age and experience would moderate the relationship between dimensions of workplace safety practices and safety performance. The research model is developed based on Hayes et al. (1998) which was used to validate the workplace safety scales as shown in Figure 3.1. Each variable included in the model is defined in the following page.

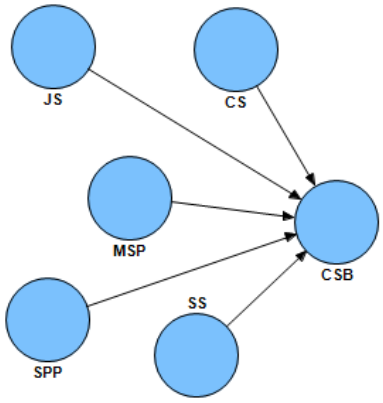

Figure 3.1. Research model

Note: CS=Co-worker safety; JS=Job safety; MSP=management safety; SPP=satisfaction with safety program; SS=supervisory safety; CSB=safety performance

3.3 Underpinning Theory

There are many theories that explain how individual behave however this study adopts the perspective of social exchange theory to explain these relationships as shown in Figure 3.1.

3.3.1 Social Exchange Theory

Social exchange theory applications in management started from the works of Blau (1964), Homans (1961), and Thibaut and Kelley (1959). The focus was merely on the rational assessment of self-interest in human social relationships. Basically social exchange theory was viewed as providing an

economic metaphor to social relationships. The fundamental principle of theory is that humans in social situations choose behaviors that maximize their likelihood of meeting self-interests. There are a few assumptions on this theory. Firstly, it operates on the assumption that individuals are generally rational and engage in calculations of costs and benefits in social exchanges. It reflects largely on issues of decision making. The second assumption is that humans through the interactions are rationally seeking for gaining or maximizing benefits from those situations. In other words the theory assumes that social exchanges that happen are efforts by the individuals to fulfil their basic needs. Third, exchange processes that produce payoffs or rewards for individuals lead to patterning of social interactions. These patterns of social interaction not only serve individuals' needs but also constrain individuals in how they may ultimately seek to meet those needs. Individuals may seek relationships and interactions that promote their needs but are also the recipients of behaviors from others that are motivated by *their* desires to meet their own needs. Finally the theory assumes that individuals are goal-oriented in a freely competitive social system. Because of the competitive nature of social systems, exchange processes lead to differentiation of power and privilege in social groups.

As in any competitive situation, power in social exchanges lies with those individuals who possess greater resources that provide an advantage in the social exchange. As a result, exchange processes lead to differentiation of power and privilege in social groups. Those with more resources hold more power and, ultimately, are in a better position to benefit from the exchange.

Tied into this concept of power in a social exchange is the principle of least interest. Those with less to gain in terms of meeting their basic needs through a social exchange tend to hold more power in that exchange. In other words, power comes from less basic dependence on a social exchange. This can be seen in patterns of power that exist within employee-employer relationships. For example, in terms of basic structural benefits, an employee has more to gain from an employer-employee relationship than an employer. The employee relies on the employer for provision of resources to meet their workplace safety needs. Because relatively few of the employer's workplace safety needs are met by the employee, the employer has less personal interest in the relationship and, consequently, holds more power than the employee in the relationship. As the employees gain experience and knowledge and eventually develops the capacity to meet their workplace safety needs, the power differential that exists in the employer-employee relationship weakens. Employer and employee now have similar personal interest in the relationship. From a social exchange perspective, then, human behavior may be viewed as motivated by desire to seek rewards and avoid potential costs in social situations. Humans are viewed as rationally choosing more beneficial social behaviors as a result of rational reviews of all available information. Because all behavior is costly in that it requires an expenditure of energy on the part of the actor, only those behaviors that are rewarded or that produce the least cost tend to be repeated. Thus, social exchanges take on an air of consistency in that patterns of rewards often remain stable in social relationships.

The main concepts of social exchange theory are equity and reciprocity. Homans (1961) originally introduced the notion that individuals are most comfortable when they perceive they are receiving benefits from a relationship approximately equal to what they are putting into the relationship. The reality, though, is that workplace is replete with relationships that promote perceptions of inequality. Relationships between employees at different level in the management are seldom truly equal in all situations. Some may get better treatment and some may be marginalized. In this theory, it is postulated that these perceptions of equality imply the presence of reciprocity. Thus, when employees perceive relatively balanced levels of reciprocity in a social exchange, they are more likely to be satisfied in that exchange. Social exchange theory suggests that individuals who perceive the presence of reciprocity in their social relationships are more likely to feel satisfied with and maintain those relationships. For example, an employee may want to take shortcuts and give less attention to workplace safety when the employee perceives that working faster (productive) as more advantageous than remaining working carefully by taking workplace safety measures which would result in lower outputs. Lower outputs is then perceived by the employee as a lower possibility to earn more, to be promoted or to be getting better performance appraisal scores.

3.4 Operational Definition of Variables

Both responses regarding workplace safety practices and safety performance were obtained from the nurses themselves. In addition, the nurses were also

asked to provide information on the demographic factors. Questionnaires in both Malay and English were provided to nurses with instructions to complete the questionnaires.

3.4.1 Safety Performance

Safety performance in the present study was used as an indicator of overall individual performance. The nurses were assessed based on perceived compliance to safety behavior being demonstrated by them. In the present study the instrument on compliance to safety behavior were adapted from Hayes et al. (1998). Thus, in the present study the eleven items instrument on compliance to safety behavior was adapted.

The previous study found internal reliability (Cronbach Alpha) for compliance to safety behavior to be 0.80 (Gyekye & Salminen, 2009). The instrument used a 5 point Likert scale from (1) Strongly Disagree to (5) Strongly Agree. Examples of items include “Wear safety equipment required by practice”, “Do not follow safety rules that I think are unnecessary”[reverse-coded], and “Keep my work area clean”. Higher ratings by nurses indicate a higher level of compliance with safety behavior. In other words the higher rating denotes high safety performance among the nurses.

Minor modifications have been made to the questionnaire to suit the study sample. In addition, the negatively worded statement, the scores were reversed so that a higher score represents a higher level of nurse’s

compliance to safety behavior and a lower score represents a lower level of nurse's compliance to safety behavior.

3.4.2 Workplace Safety Practices

Workplace safety practices in the present study were used as a predictor to safety performance. The nurses were assessed based on perceived safety practices being practiced at their workplace. In the present study the instrument on workplace safety practices from Hayes et al. (1998) were adapted. In the present study a total of fifty items on workplace safety practices were adapted.

The previous study found internal reliability (Cronbach Alpha) for i) job safety to be .96; ii) co-worker safety to be .80; iii) supervisory safety to be .97; iv) management safety to be .94; and v) satisfaction with safety behavior to be .86 (Gyekye & Salminen, 2009). The instrument used a 5 point Likert scale from (1) Strongly Disagree to (5) Strongly Agree. Examples of items include "My job is safe", "My co-worker don't care about others safety"[reverse-coded], and "My supervisor enforces safety rules". Higher ratings by nurses indicate a higher level of workplace safety practices being practiced at work.

Minor modifications have been made to the questionnaire to suit the study sample. In addition, the negatively worded statement, the scores were reversed so that a higher score represents a higher level of nurse's perception on workplace safety practices being practiced at work and a lower

score represents a lower level of nurse's perception on workplace safety practices being practiced at work.

3.4.3 Age

Age refers to the biological age of the respective nurses. Age was measured by requesting each nurse's to state their actual age (ratio scale).

3.5 Statement of Hypothesis

Drawing upon the literature review presented in the previous chapter and the theoretical justification above, hypotheses have been formulated, which are to be tested in this study. With the exception to the hypotheses that concerns the moderating effects, each main effect hypotheses are stated in the form of an alternate hypothesis. Based on previous studies as well as taking the perspective of social exchange theory, the following hypotheses are advanced for this study.

3.5.1 Main Effect

The following five hypotheses are concerned with the relationship of dimensions of workplace safety and safety performance.

H1: Workplace safety practices will enhance compliance with safety behaviour.

H1a: Job safety will increase compliance with safety behaviour at work.

H1b: Co-worker safety practices will increase compliance with safety behaviour at work.

H1c: Supervisor safety practices will increase compliance with safety behaviour at work.

H1d: Management safety practices will increase compliance with safety behaviour at work.

H1e: When employees are satisfied with safety programs instituted, they will comply with safety behaviour at work.

3.5.2 Interacting Effect

The following are hypotheses regarding the interacting effect of the present study.

H2: Employees in different age groups tend to comply with safety behaviour at work when they perceive favourably that the workplace safety practices are put in place.

3.6 Measurement Instruments

To collect the data for the study one set of questionnaire was prepared to be answered by nurses. Each nurse was assigned a code number for identification based on the hospital they are working. The code for each hospital was abbreviation of the location of the hospital (i.e. Alor Setar was

written as AS), while the respondent number (i.e. 1, 2, 3, 4, 5, etc) was based on the number of nurses in the particular hospital available during the data collection period. Within the SPSS data file, demographic factors (8 items), self-ratings of workplace safety dimensions (50 items), and self-ratings of compliance with safety behavior (11 items) were keyed-in using the first 69 columns.

The cover letter on first page of the questionnaires stresses that the survey is for scientific purposes only and all responses will be kept private and confidential. A consent to participate form was also attached with the questionnaire as suggested by the Institute of Medical Health (IMR), Ministry of Health (MOH). In addition, the cover letter included the approximate time to complete the survey, identification of the researcher, purpose of the survey, the objective of the study, how the data will be used, and expression of appreciation for participating and responding.

The questionnaire (as in Appendix A) contained 64 items which was divided into seven sections as follows; (a) Section A - demographic information, (b) Section B – self-ratings of perceived job safety, (c) Section C - self-ratings of perceived co-worker safety, (d) Section D - self-ratings of perceived supervisory safety, (e) Section E - self-ratings of perceived management safety, (f) Section F - self-ratings of perceived satisfaction with safety program, and (g) Section G – self-ratings of perceived compliance with safety behavior. Table 3.2 shows the item distribution for the questionnaire.

Table 3.1

Distribution of Items in the Team Member Questionnaire

Variable	Number of Items	Number of Adapted Items
SECTION A		
Demography	8	1,2,3,4,5,6,7,8
SECTION B		
Job Safety	10	1,2,3,4,5,6,7,8,9,10
SECTION C		
Co-worker Safety	10	1,2,3,4,5,6,7,8,9,10
SECTION D		
Supervisory Safety	10	1,2,3,4,5,6,7,8,9,10
SECTION E		
Management Safety	10	1,2,3,4,5,6,7,8,9,10
SECTION F		
Satisfaction with Safety Program	10	1,2,3,4,5,6,7,8,9,10
SECTION G		
Compliance with Safety Behavior	10	1,2,3,4,5,6,7,8,9,10,11
Total	**69**	

3.6.1.1 Response Formats

As mentioned earlier, a 5-point Likert type scale with uniform descriptive anchors ranging from 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree was used to measure all items in section B to section F. The purpose of a rating scale is to enable respondents to express the direction and strength of opinion on the statements in the questionnaire (Garland, 1991). The usage of Likert type scale represents the position and the preference of an individual towards an object. In addition, the resulting single score of the overall responses reflects different patterns of belief, intention, and actions (Ajzen & Fishbein, 1980). The dependent

variable was also measured on a 5-point Likert type scale with a different uniform descriptive anchors ranging from 1=never, 2=seldom, 3=sometimes, 4=aften, and 5=always and was listed in section G.

3.6.2 Translation

The original questionnaire had been prepared in English. However, because the respondent understood English to a certain extent, and in order to ensure that every respondent understood well the items/statements asked, the entire instrument was translated into Malay. A back translation method was used to ensure equivalence of measures is achieved in both Malay and English (Brislin, 1970). The English version of the questionnaire was translated into standard Malay by an adult Malay, who is bilingual. The individual has vast experience in translation and has attended various courses in translation organized by Dewan Bahasa dan Pustaka (DBP). Dewan Bahasa dan Pustaka (Malay for The Institute of Language and Literature) (abbreviated DBP) is the government body responsible for coordinating the use of the Malay language in Malaysia.

Later the Malay version of the questionnaire was back translated into English by another individual who is providing translation services, operating in a public university. The individual is well versed in both Malay and English. The researcher held a few discussions with the translators in order to make sure that the original meanings were maintained each time after the translation was conducted. A comparison between the original version of the English

questionnaire and the back translated English version questionnaire was done and suggested that no major rewording was needed for any particular item.

3.7 Pilot Study

A pilot study was conducted among 5 nurses working in a government hospital. The distribution and collection of the questionnaires was done in a self-administered manner personally by the researcher. This ensured a 100% response rate. The pilot study was intended to obtain response on the clarity of the items in terms of its applicability and meaning.

3.8 Main Study

Once the instrument is found to have no major issues on clarity, the main study was deployed. The questionnaire was administered to the selected sample for the present study.

3.8.1 Population

Since the study is about examining workplace safety practices and its relationship with safety performance among nurses, it was appropriate that these people involved with patient care work were considered. In this context, the present study has chosen to study the topic amongst nurses employed by the Ministry of Health in Northern Region of Malaysia. Specifically, only

nurses giving patient care activities. One of the reason for choosing this group of people was because they are recognized as one of them who are directly exposed to workplace hazards at a medical setting. The selected hospitals are Hospital Tuanku Fauziah Kangar, Hospital Sultanah Bahiyah Alor Setar, Penang General Hospital, and Hospital Taiping.

The unit of analysis of the present study is individuals. Based on the latest statistics from selected hospitals, as of 1st June 2012, the total number of nurses employed by the Ministry of Health in hospitals at the Northern Region of Peninsular Malaysia is as follows:

Table 3.2

Total Nurses in the selected hospitals

Hospital	U29	U32	U36
Hospital Tuanku Fauziah Kangar	497	44	5
Hospital Sultanah Bahiyah Alor Setar	1138	85	9
Penang General Hospital	1241	101	12
Hospital Taiping	636	62	3
Total	3512	292	29

Note: U29,U32 & U36 denotes the grades in their occupation

Source: Ministry of Health, 2012

Table 3.4 indicates that as of 1st June 2012, the total number of nurses in the selected four hospitals is 3833. However, nurses in the position of U29 are the largest population in any government hospital in Malaysia. Therefore, this study will only examine this group. As such the population of this study is the

nurses at the grade U29 of the selected 4 hospitals in the Northern Region of Peninsular Malaysia.

3.8.2 Sample Size

As a matter of practicality, sampling was conducted rather than collecting data from every element of the population (Sekaran, 2003; Zikmund, 2003) because, selecting a sample is likely to produce more reliable results (Sekaran, 2003).

To select the sample, quota sampling was used. Quota sampling was selected because the researcher wanted each hospital is included in the sample (Zikmund, 2003). The quota sampling also allows various subgroups (selected hospitals) are represented The advantage the quota sampling provides are the cost of data collection is low and it allows a great extent of convenience in selecting the sample for the study.

Sample size for this study consisted of 351 nurses, which is what has been specified by Krejcie and Morgan (1970) for a population of 3512, that is 351 for a population of 4000. Furthermore, the sample size of the present study complied with the rule of thumb by Roscoe (1975) who stated that for most research sample size bigger than 30 and less that 500 are appropriate. Therefore, 351 is adequate based on the rule of thumb. Secondly, in a multivariate research, i.e. multivariate analysis, the sample size should be several times (preferably 10 or more times) as large as the number of

variables. In the present study there are 5 variables and the required sample size should be 50 or more.

Therefore, in this a total number of 100 nurses from the selected 4 hospitals comprising Hospital Tuanku Fauziah Kangar, Hospital Sultanah Bahiyah Alor Setar, Penang General Hospital and Hospital Taiping have been randomly selected as the sample. The selected sample size can be considered reasonable and manageable in terms of cost and time.

3.8.3 Data Collection

The present study required very minimal interference by the researcher in the sense that the researcher administered the questionnaires only. The present study was conducted at the field setting using the same natural environment (Sekaran, 2003). Field studies are ex post facto designs because researchers make no attempt to control or manipulate the variables of study (Davis, 2000). Data for the present study were obtained from the nurses in the selected four hospitals in Northern Region of Peninsular Malaysia. Written permission to conduct the study at the Ministry of Health was obtained earlier from the Director General. The ministry required this study to be registered with the National Medical Registry (NMRR). The process involved a registration via online with the registry. In addition, the process also required the researcher to apply a consent/approval from the respective selected hospital where the study was conducted. The consent/approval was given by both the Matron and the Director of the respective hospital.

Initial visit was made to the selected hospitals to obtain the consent/approval and the subsequent visits were made soon after getting approval from the NMRR board. The approval letters are as in Appendix B. The subsequent visits were mainly to distribute and collect the questionnaire for the main study. The whole data collection process took place 6 months, beginning from early March 2012 until mid of November 2012.

3.8.4 Data Analysis

Upon completing the task of data collection, preliminary test was conducted to determine the response rate, validity, and reliability of the study construct. Confirmatory factor analysis and reliability analysis were used to assess the validity and reliability of the study variables. Response rate was computed by calculating the frequency and percentage of response and later compared to the sample size determined before data collection. The descriptive statistics namely mean, median, standard deviation, frequencies, and percentage were used to describe the main characteristics of the sample. The measurement model and the structural model was assessed using the PLS approach.

3.9 Summary

This chapter has describes the methodology used, which includes the measurement of variables, survey instrument, translation, sampling, data collection strategies and methods of data analysis to answer the research

questions. In addition it has also explained the process of checking the reliability of the construct instruments based on the pilot study conducted prior to the actual study. The details of the population and sample of this study are also presented. The following chapters will explain the validity and reliability tests conducted on the study construct instrument.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This chapter will entail the demographic characteristics of the respondents, goodness of measures and the relationship between dimensions of workplace safety practices and safety performance. In addition, this chapter will also furnish the results of the moderating effect of age on the relationship between dimensions of workplace safety practices and safety performance. The first section will report the response rate and the description of the study sample while the second part will consist of descriptive statistics, measurement model and the structural model with hypothesis testing.

4.2 Response Rate

As mentioned in the previous chapter, the sample size for the current study is 351 nurses working in Hospital Tuanku Fauziah Kangar, Hospital Sultanah Bahiyah Alor Setar, Penang General Hospital and Hospital Taiping. In an effort to increase the response rate and to equally distribute the questionnaire to these 4 selected hospitals a total of 400 (100 x 4 hospitals) questionnaires were distributed. The data for the study variables were obtained through self-administered manner with the assistance of the respective Matrons of the selected hospitals. This approach facilitated higher chances of questionnaire retrieval. In addition, distributing of questionnaire by the researcher

during working hours are not so practical especially in hospital setting. This effort yielded in a return of 323 questionnaires for analysis out of the 400 questionnaires being distributed which resulted in 80.75 response rate. Out of the 323 retrieved questionnaires, three five were not usable due to poorly filled and did not have adequate data suitable for further processing. According to Bryman and Bell (2007), Fowler et al. (2002) these questionnaires can be discarded. This elimination resulted in the total number of usable questionnaires to be 288. A further examination of the data resulted in ten respondents were eliminated due to outlier. Therefore final 278 responses were used for further analysis which resulted in 69.5 response rate for final analysis. This rate is considered adequate because it agrees with some underlying assumptions for data analysis. Firstly, the total number of usable questionnaire agrees with Bartlett, Kotrlik, and Higgins's (2001) suggestion that for a regression type analysis, the sample size should fall between five and ten times the number of independent variables. However, Halinski and Feldt (1970) and Miller and Kunce (1973) opined that the more conservative figure of ten is preferred in order to avoid over fitting. Secondly, for the Partial Least Squares (PLS) program that is to be used for the main analysis, Chin and Newsted (1999) suggested a minimal number of between 30 and 100 cases. Therefore, this sample size is good for further analysis. The summary of the response rate is presented in table 4.1 below.

Table 4.1 Response Rate

Status	Number of Questionnaires	Response Rate
Distributed	400	
Returned	323	80.75%
Usable	278	69.5%
Unusable	45	11.25%

4.3 Data Coding and Entering

Items in the questionnaire were coded using easily identifiable codes based on the location of hospitals and the number of respondent. This was succeeded by coding each of the variables based on the questionnaire items with two or three letters and a particular number. For example, a questionnaire from Hospital Sultanah Bahiyah was coded as BHY 1, for the number one questionnaire from the Hospital Sultanah Bahiyah. The independent variable and dependent variable were coded according to simple abbreviation given by the researcher himself to help data entry process. For example job safety was coded as “JS”, co-worker safety was coded as “CS”, supervisory safety was coded “SS”, management safety was coded as “MS”, satisfaction with safety program was coded as “SSP” and compliance with safety behaviour was coded as “CSB”.

4.4 Data Screening and Cleaning/Treatment

Soon after the raw data has been entered in the SPSS the process of data screening and cleaning/treatment is required. This involves checking for errors in the data

collected (Pallant, 2007). These errors take the form of missing data or out of range data (values that fall outside the range of possible values for a scale). It was therefore important for the researcher to check on these and handle them accordingly. According to Pirker (2009), it is recommended to handle missing values with imputation by replacing missing values using the remaining values of the data. To obtain accurate model specifications, the mean can be used for the imputation (Sekaran, 2003). Using the mean to replace missing values also leads to more reliable results than casewise deletion (Parwoll & Wagner, 2012). This is because in for pre-processed data that is intended to be exported to the PLS path modelling software, casewise deletion will throw away a lot of useful information, which will in turn lead to lower efficiency, and thus not recommended (Temme, Kreis, & Hildebrandt, 2006). Based on this recommendation, a few cases of missing values which were identified were replaced accordingly using the mean values of the items. This was done as the number of missing values did not pose any statistical threat to the analysis phase of this study. In addition to the above treatment, tests on normality was not done because the PLS is a distribution-free approach. It also uses the usual maximum likelihood estimation method, which assumes multivariate normality (Lohmöller, 1989). Since the PLS factors are orthogonal, the issue of multicollinearity is not a problem.

4.5 Description of the Sample of Study

In this section the respondents are described based on their demographic background. The discussion will entail sex, marital status, education level, race, age and experience. The information is presented in table 4.5 below.

Table 4.2 Description of Sample of Study

Description of Samples	Number	Percentage
Sex		
Male	13	4.7
Female	265	95.3
Marital Status		
Single	82	29.5
Married	193	69.4
Divorced/Widowed	3	1.1
Education Level		
MCE/SPM/SPMV	38	13.7
HSC/STPM	8	2.9
Diploma	216	77.7
Degree	16	5.8
Race		
Malay	252	90.6
Chinese	17	6.1
Indian	7	2.5
Others	2	0.7
Age	M= 31.94	SD= 7.99
Experience	M= 7.91	SD= 7.19

Table 4.2 presents background information on the nurses in from the selected hospitals that participated in the survey. Based on the information on table 4.2 above, it can be seen that most of them are female nurses (95.3%) and most of them are married (69.4%) and Malay (90.6%). In terms of their education level majority of them possess a

diploma (77.7%). The mean age of the respondent are 31.94 with a standard deviation of 7.99 which is reasonable as the study focused only the nurses at grade U29 (junior nurses). With respect to the years of experience they have as nurses it is reasonably long (M=7.91, SD=7.19).

4.6 Data Analysis

The Statistical Package for Social Sciences (SPSS) was used for preliminary analysis consisting of descriptive statistics of the respondents obtained. In addition to answer the first and the second research questions related to the level of safety performance and workplace safety practices among the nurses the valid and reliable items were also computed using the SPSS.

The main analysis consisting of the validity and reliability of the constructs and item (measurement model) and hypothesis testing (structural model) the Partial Least Squares (PLS) path modelling technique approach was used. The PLS was chosen due to several reasons firstly it is a useful and flexible tool for statistical model building. Specifically, the PLS facilitates the analysis and investigation of large and complex path models. According to Chin and Newsted (1999), the PLS is optimal for prediction accuracy, and is very suitable for a non-parametric analysis. In addition, it also does not require normal data distribution and accommodates small sample sizes. Furthermore, the researcher chose the PLS approach for its advantages over the covariance

approach, which include theoretical conditions, measurement conditions, distributional considerations and practical considerations (Falk & Miller, 1992).

4.6.1 Measures and Assessment of Goodness of Measures

As previously mentioned the data for the present study was collected by using a five point likert scale questionnaire. These items were adapted from previous studies and minor modification was done to suit the context of this study. The questionnaire was designed based Hayes et al. (1998).

4.6.1.1Reliability Analysis

Reliability is a test of how consistently an instrument measures the concept it is supposed to measure (Sekaran & Bougie, 2010). Meanwhile, Bohrnstedt (1970) also noted that the reliability of the measurement item refers to which part of a measurement items variance can be explained by the underlying factor. The composite reliabilities as suggested by Werts, Linn and Joreskog (1974) and Gotz, Liehr-Gobbers, and Krafft (2010), was used to assess the reliability of the latent variable. This is because the Cronbach's alpha with its assumption of parallel measures represents a lower bound estimate of internal consistency. Similar to Cronbach's alpha for internal consistency reliability estimate, a composite reliability of 0.70 or greater is considered acceptable (Fornell & Larcker, 1981). In addition, Hair et al. (2010) also suggested that loadings above 0.50 can be considered as significant. Besides the loading it is also important to

determine if the items loaded on the other constructs equally as well as on their theorized construct, and cross-loadings (Gerbing & Anderson, 1988). The results are presented as Table 4.3

4.6.1.2 Factorial Validity

Factorial validity is another important in the context of establishing the validity of latent constructs (Gefen & Straub, 2005). Validity is a test of how well an instrument that is developed measures the particular concept it intended to measure (Sekaran & Bougie, 2010). According to Churchhill (1979) and Gerbing and Anderson (1988), two elements of factorial validity can and must be measured when using PLS for data analysis. These two elements are convergent validity and discriminant validity, which Straub, Boudreau, and Gefen (2004) described as components of a larger scientific measurement concept known as construct validity. Gefen and Straub (2005) again noted that the convergent validity and discriminant validity capture some of the aspects of the goodness of fit of the measurement model. The measurement model (or outer model) was then developed by the researcher. Examining the outer model ensures the survey items are measuring the constructs they were designed to measure, thus ensuring that the survey instrument is valid. To determine the individual items reliabilities, the researcher looked at their loadings to their respective constructs. This information will then be presented in Table 4.3. In addition to that table 4.4 presents the loadings and cross-loadings of the items for each of the constructs.

Table 4.3 Measurement Model (Convergent Validity)

Example of the Item	Construct	Scale	Loadings	AVE[a]	CR[b]
My job is hazardous	**Job Safety**	Reflective	0.751	0.597	0.880
My work is unhealthy		Reflective	0.868		
I could get hurt easily in my job		Reflective	0.726		
There is a chance of death in my job		Reflective	0.717		
My job is scary		Reflective	0.791		
My co-workers pay attention to safety rules	**Co-Worker Safety**	Reflective	0.831	0.755	0.949
My co-workers follow safety rules		Reflective	0.902		
My co-workers look out for others' safety		Reflective	0.864		
My co-workers encourage others to be safe		Reflective	0.831		
My co-workers keep work area clean		Reflective	0.914		
My co-workers safety-oriented		Reflective	0.870		
My immediate supervisor involves workers in setting safety goals	**Supervisor Safety**	Reflective	0.769	0.678	0.863
My immediate supervisor trains workers to be safe		Reflective	0.867		
My immediate supervisor enforces safety rules		Reflective	0.831		
Management provide safe working conditions	**Management Safety**	Reflective	0.954	0.865	0.927
Management provides safety information		Reflective	0.905		
Safety programs at my workplace is important	**Satisfaction with Safety Program**	Reflective	0.872	0.815	0.930
Safety programs at my workplace is doesn't apply to my workplace		Reflective	0.885		
Safety programs at my workplace is does not work		Reflective	0.949		
I overlook safety procedures in order to get job done more quickly	**Compliance with Safety Behavior**	Reflective	0.907	0.802	0.890
I do not follow safety rules that I think are unnecessary		Reflective	0.884		

a Average variance extracted (AVE) = (summation of the square of the factor loadings)/{(summation of the square of the factor loadings)+(summation of the error variances)}
b Composite reliability (CR) = (square of the summation of the factor loadings)/{(square of the summation of the factor loadings) + (square of the summation of the error variances)}

Based on the composite reliability values as presented in table 4.3 above, and in agreement with the suggestion of Fornell and Larcker (1981), Hair et al. (2010), all the

constructs are individually reliable. The CR values were determined when the items that did not meet the minimum loading factors were removed.

Table 4.4 Loadings and Cross Loadings

	CS	CSB	JS	MSP	SPP	SS
CS3	**0.831**	0.492	0.382	0.178	0.564	0.167
CS4	**0.902**	0.417	0.556	0.347	0.611	0.193
CS5	**0.864**	0.237	0.471	0.430	0.492	0.190
CS6	**0.831**	0.352	0.249	0.102	0.451	0.238
CS8	**0.914**	0.278	0.412	0.339	0.519	0.283
CS9	**0.870**	0.452	0.407	0.066	0.507	0.292
CSB1	0.417	**0.907**	0.310	-0.203	0.582	0.125
CSB9	0.397	**0.884**	0.343	-0.018	0.534	0.300
JS10	0.449	0.227	**0.791**	0.219	0.467	0.089
JS3	0.237	0.176	**0.751**	0.186	0.357	-0.063
JS5	0.495	0.454	**0.868**	0.076	0.693	0.048
JS6	0.172	0.180	**0.726**	0.067	0.393	-0.023
JS9	0.332	0.150	**0.717**	0.316	0.335	0.178
MSP6	0.251	-0.137	0.203	**0.954**	0.012	0.268
MSP9	0.222	-0.096	0.134	**0.905**	0.087	0.348
SPP10	0.532	0.574	0.607	0.017	**0.949**	0.190
SPP7	0.674	0.604	0.582	0.041	**0.872**	0.223
SPP9	0.429	0.502	0.539	0.070	**0.885**	0.048
SS5	0.261	0.213	-0.054	0.310	0.134	**0.769**
SS8	0.222	0.202	0.161	0.268	0.164	**0.867**
SS9	0.130	0.141	0.032	0.191	0.132	**0.831**

Bold values are loadings for items which are above the recommended value of 0.5 (Hair, 2010)

According to Chin (1998), standardized loadings should be greater than 0.707. However, in an exploratory research of this nature, the researcher used the rule of thumb as suggested by Hair, Anderson, Tatham, & Black (Hair, Anderson, Tatham, & Black, 1998) and Hair et al. (2010) to determine the items that load for each of the constructs. When the PLS algorithm was run, the loadings of 40 items that were below the acceptable value were removed before further analysis was done. The rest of the remaining items had a minimum loading value of 0.7. This is a signification indication

that the measures were adequate in their validity individually. Also, using the loadings of items on each of the constructs in table 4.4 above, and in line with the suggestion of Chin (1998), Hair et al. (1998) and Hair et al. (2010), the results are said to be reliable, valid and suitable for further analysis.

4.6.1.3 Construct Validity

Construct validity affirms to how well the results gotten from the use of the measure fit the theories around which the test is designed (Sekaran & Bougie, 2010). The issue to be addressed here is if the instrument explains or has a strong connection with the concepts as theorized. The researcher examined the factor loadings and cross loadings in table 4.4 to ascertain if there are problems with any particular items. A cut off value of 0.5 (being significant) as suggested by Hair et al. (2010) was used in this regard. In view of this, if any items which has a loading of higher than 0.5 on two or more factor, then they will be deemed to be having significant cross loadings. Therefore, based on table 4.4, it is concluded that construct validity is confirmed.

4.6.1.4 Convergent Validity

The next analysis done by the researcher was to test the convergent validity. This is the degree to which multiple items measuring the same concept are in agreement. As suggested by Hair et al. (2010), the factors loadings, composite reliability and average variance extracted was used to assess convergent validity. Based on the presentation

in table 4.3 and table 4.4 , the loadings converge very well and exceed the recommended 0.5 value as recommended by Hair et al. (2010). Also, the composite reliability (CR) values in table 4.3 which ranged from 0.863 to 0.949 exceeded the recommended value of 0.707 by Hair et al. (2010) and Chin (1998). Also the average variance extracted (AVE) which measures the variance captured by the indicators relative to measurement error, which should be 0.50 Barclay, Thompson, & Higgins (1995). From table 4.3 the AVE was in the range of 0.597 to 0.865.

4.6.1.5 Discriminant Validity

The researcher proceeded with testing the discriminant validity of the constructs. This was done by assessing the correlations between the measures of potentially overlapping constructs and the average variance extracted for each construct should be greater than the squares of the correlations between the construct and all other constructs (Fornell & Larcker, 1981). Compeau, Higgins, & Huff (1999) also noted that items should load more strongly on their own constructs in the model, and the average variance shared between each construct and its measures should be greater than the variance shared between the construct and other constructs.

Table 4.5 Discriminant Validity

	CS	CSB	JS	MSP	SPP	SS
CS	**0.869**					
CSB	0.455	**0.895**				
JS	0.476	0.364	**0.772**			
MSP	0.256	-0.129	0.187	**0.930**		
SPP	0.612	0.624	0.640	0.046	**0.903**	
SS	0.260	0.232	0.056	0.322	0.176	**0.823**

Note: Diagonals represent the square root of the AVE while the off-diagonals represent the correlations.

As shown in table 4.5, all of the average variance extracted (AVE) are greater that the recommended 0.50 level. In a similar vein, the square root of the AVE (as shown on the diagonal in bold) is greater that the correlations between the constructs. Based on the above tests of validity and reliability of the constructs, the results show that all the items validly and reliably measure the constructs there were meant to measure based on their parameter estimates and statistical significance (Chow & Chan, 2008). The tests also indicate some level of goodness of fit of the hypothesized model.

4.7 Descriptive Statistics (Mean of the Composite Factors)

The next analysis done by the researcher was to compute the mean of the composite factors. The items that were found to be reliable and valid (as extracted) were then averaged to calculate the mean and standard deviation value for each of the constructs. Table 4.6 shows the mean of the study construct. After this has been done, the researcher now proceeded with the hypothesis testing.

Table 4.6 Mean of the Composite Factors

Latent Variable	Mean	Standard Deviation
Job Safety	3.054	0.919
Co-Worker Safety	3.842	0.685
Supervisory Safety	3.987	0.364
Management Safety	3.829	0.719
Satisfaction with Safety Programs	3.760	0.753
Compliance with Safety Behaviour	3.940	0.857

Note: Measurement scale – 1 = Strongly Disagree to 5 = Strongly Agree

4.8 Hypothesis Testing

In the PLS path modelling algorithm, the bootstrapping technique (Chin, Marcolin, & Newsted, 1996) was used with 278 cases (being the sample size) and 500 bootstrapped samples to test the hypothesis of this study. Also, the goodness of the path coefficients can be tested by t-statistics using the same method as mentioned above. The t-values were computed and their significance level was assessed with a one-tailed distribution (Chin et al., 1996; Churchill, 1979; Sharma, 1996). For the case of a one-tailed test, s significance of 1% corresponds to a t-value of over 2.326, a significance of 5% to a t-value between 1.645 and 2.326, finally a significance of 10% to a t-value between 1.282 and 1.645 (Churchill, 1979; Sharma, 1996). However, the study only used the 1% and 5% significance value and this is in accordance to the norms in business research. The main effect results are as shown in table 4.7.

Table 4.7 Paths coefficient

Hypothesis	Relationship	Beta	Std Error	T-Value	Decision
H1	**JS -> CSB**	0.001	0.068	0.017	**Not Supported**
H3	**CS -> CSB**	0.164	0.056	2.957	**Supported**
H5	**SS -> CSB**	0.183	0.044	4.125	**Supported**
H4	**MSP -> CSB**	-0.253	0.070	3.591	**Not Supported**
H5	**SPP -> CSB**	0.502	0.083	6.048	**Supported**

**p<0.01 (2.33), *p<0.05 (1.645)

Hypothesis 1 predicted that there would be a positive relationship between job safety and compliance with safety behaviour. As the results in Table 4.7 indicate job safety is not related to compliance with safety behaviour ($\beta = 0.001$, $p > 0.05$). Thus hypothesis 1 was not supported. Hypothesis 2 posited that co-worker safety would be positively related to compliance with safety behaviour. The results showed that co-worker safety had a strong positive relationship with compliance with safety behaviour ($\beta = 0.164$, $p < 0.01$), which provides support to hypothesis 2. Hypothesis 3 predicted that there would be a positive relationship between supervisor safety and compliance with safety behaviour. The results indicate that there is a strong positive relationship between them ($\beta = 0.183$, $p < 0.01$), which provided support to hypothesis 3. While hypothesis 4 posited that management safety practices would be positively related to compliance with safety behaviour. Even though the results indicate significance but the direction was not as what has been posited in the hypothesis. The results indicated a negative relationship between management safety practices and compliance with safety behaviour ($\beta = -0.253$, $p < 0.01$), thus rejecting hypothesis 4. Finally hypothesis 5 posited that satisfaction with safety program would be positively related to compliance with safety behaviour. Results in table 4.7 indicates that satisfaction with safety program

had a strong positive relationship with compliance with safety behaviour (β = 0.502, p < 0.01) supporting hypothesis 5. In sum the current study results indicated that satisfaction with safety program is the strongest while co-worker safety is the weakest predictor to compliance with safety behaviour.

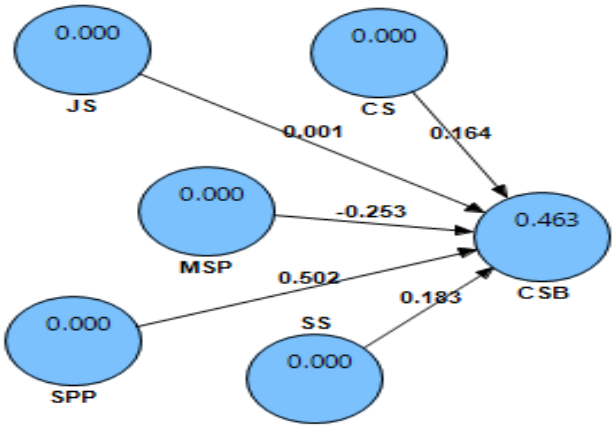

Figure 4.1 Results of the path analysis

The next analysis done by the researcher was to test the moderation effect of age on the relationship between the independent variables and the dependent variable. As suggested by Henseler, Horváth, Sarstedt, & Zimmermann (2010), in the PLS path modelling algorithm, both the exogenous variable and the moderating variable were considered as independent latent variables in the model. This was followed by the performance of a multiple linear regression (using the bootstrapping technique) between the variables. The results are meant to confirm the moderating effect of age of the relationship.

Table 4.8 Paths coefficient with moderation

Hypothesis	Relationship	Beta	Std Error	T-Value	Decision
H7	Age -> SP	0.168*	0.086	1.963	Supported
H8	JS * SC -> SP	-0.060	0.083	0.730	Not Supported
H9	CS * SC -> SP	-0.022	0.093	0.236	Not Supported
H10	SS * SC -> SP	0.213	0.160	1.331	Not Supported
H11	MSP * SC -> SP	-0.092	0.104	0.878	Not Supported
H12	SPP * SC -> SP	-0.122	0.077	1.585	Not Supported

**p<0.01 (2.33), *p<0.05 (1.645)

From table 4.8 above, it is evident that Age has a positive direct effect on compliance with safety behaviour ($\beta = 0.168$, $p < 0.05$). Meanwhile, the results indicate that the moderating interaction on job safety, co-worker safety, supervisor safety, management safety, and satisfaction with safety programs were not statistically significant.

4.9 The Quality Indexes – Goodness of Fit

PLS path modelling lacks a well identified global optimization criterion so that there is no there is no global fitting function to be evaluated to determine the goodness of the model. This is also because it is a variance-based model strongly oriented to prediction (Trinchera & Russolillo, 2010). The model is however fit, if the measurement model, the structural model (Amato, Esposito, & Tenenhaus, 2005), and the overall model is validated (Tenenhaus, Esposito, Chatelin, & Lauro, 2005). Chow and Chan (2008) also suggested that the overall model showing the latent and manifest variables meets the criteria for Goodness of Fit if the measurement items are valid. And as reported in the

previous sections (validity analysis), the structural model of this study is fit and is a representation of what the researcher intends to measure. However, Tenenhaus et al. (2005) further proposed a single a single measure for the overall GoF of the model based on communality and R^2 (R-Square) of factors. To ascertain this, the communality index, the redundancy indexes are used in this regard. In addition to the above, since the PLS path modelling technique does not rely on distribution assumptions, direct inference statistical tests of the model fit and the model parameters are not available. In a nutshell, the GoF = square root (average (Communality) * average (R)). That is the geometric mean of the average communality and the average R^2 (Amato et al., 2005). This index is varied between 0 and 1 (Tenenhaus et al., 2005). According to the classification of the effect sizes for R^2, and using 0.5 as the cuff-off value for Communality proposed by Fornell and Larcker (1981), the GoF criteria would be (small: 0.1; medium: 0.25; large: 0.36) (Wetzels, Odekerken-Schroder, & Oppen, 2009).

Based on the above and in recourse to figures 4.8, the GoF is 0.3421 and is considered to be large, which is in line with the suggestion of Fornell and Larcker (1981).

4.10 Summary

Generally the study found support for the adapted measures in the present study. The confirmatory factor analysis and the reliability analysis indicates that the items adapted are valid and reliable. Therefore it can be computed for further analysis.

The PLS structural model analysis revealed that co-worker safety, supervisor safety and satisfaction with safety program are variables that help in explaining the variance in compliance with safety behavior. While the study also found that age did not moderate the relationship between workplace safety practices and compliance to safety behavior. The following chapter will discuss the findings followed by managerial and theoretical implications, suggestion for future research, limitation, and the conclusion of the present study.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.8 Introduction

In the last chapter, the results of the study have been presented. In addition, the results of the developed hypotheses were presented. In this chapter, attempts will be made to discuss the results obtained in the present study. This would then be followed by the implications of the research on theory and practice, and in addition to suggestions for future research. Finally, limitations of the present research will be highlighted.

5.9 Recapitulation of Result

As mentioned in Chapter 4, 46.3% of the variance in the compliance with safety behavior was explained by the Workplace Safety Practices variables, i.e., job safety, coworker safety, supervisor safety, management safety practices and satisfaction with safety program. Satisfaction with safety program has the largest beta coefficient (0.502), which is the strongest contribution to explaining the compliance with safety behavior variable. The supervisor safety obtained 0.183 to be the second highest beta value and the third highest beta value is coworker safety with 0.164. However, age was not found to moderate the relationship between safety management practices and compliance with safety behavior.

5.10 Discussion

The response rate of 91.45 percent indicated that results were likely to represent the perceptions in all the area surveyed. All the measures indicated would be discussed on the relationship between the five independent variables to the dependent variable. This discussion would be answering the questions in Chapter One regarding the independent variables and dependent variables.

5.3.1 Job Safety with Compliance Safety Behavior

The present study hypothesized that job safety will significantly related to compliance with safety behavior. However, the results indicate that job safety was not significantly related to compliance with safety behavior. There are several possibilities in explaining a non-significant result as obtained in this study. Firstly, frequency of threat, near misses and accidents would create a conception that their job is dangerous. In this context there is a possibility that the nurses examined would not have experienced frequent workplace accident or near misses and this in turn would have resulted in them having a perception that their job is less hazardous. This claim is supported by a study among mental health professionals that found that frequency of assaults and threats are significantly related to their attitudes regarding their job safety (Hughes & Gilmour, 2010). Secondly, the characteristics of the population being examined which are nurses and most of the clinical workers are exposed and understand clearly the risks associated with the job. This could be a potential explanation as organization from

which the sample is drawn has an excellent safety record, although there are some minor incidences. Under these conditions without serious injuries may a result of nurses being unsure if their job is hazardous of safe (Parboteeah & Kapp, 2008). This in turn could have resulted in a non-significant relationship in relation to compliance with safety behavior. This is further strengthen when nurses are equipped with proper and relevant personal protective equipment to perform their task effectively. Thirdly, they are probably more concern of health hazards than safety hazards. The tendency for them to identify safety hazards are low as they are more cautious of the health hazards that they are working with. Therefore, it is plausible to note that they are more judging their job to be hazardous from the health perspective as to safety perspective. This is partly because the measures adapted in the present study skews to responding based on safety hazards. Fourthly, safety hazards are known to cause acute symptoms while the health hazards are viewed as chronic symptoms. These chronic symptoms appear after a long period of time as compared to acute symptoms which are relatively quick to be discovered (Goetsch, 2008). Viewing from this point there is a possibility that nurses view their job as being not dangerous as compared to other jobs in the construction and manufacturing sectors. Fifthly, there are possibilities that employees have a perception that accidents at workplace indicates that their job is hazardous. Having this in mind we are also aware that not all hazardous job results in workplace accidents. These reasons could be some explanation for a non-significant relationship obtained in this study.

5.3.2 Co-worker Safety with Compliance Safety Behavior

As hypothesized the study found a significant relationship between co-worker safety and compliance with safety behaviour. The findings of this study are consistent with previous attempts by other scholars (Brondino et al., 2012; Fugas et al., 2011; Jiang et al., 2010; Kapp, 2012). For example Brondino et al. (2012) found that co-worker safety helped to improve safety to both individual and also at the group level among Italian blue collar workers in the manufacturing sector. Similar findings were also obtained when such examination took place among the transport company employees (Fugas et al., 2011).

There would be several explanation for obtained such result. Firstly it is clearly noted that co-worker attitude and behaviour have a significant bearing on how employees behave at work, consistent with the main proposition of social learning behaviour by Bandura (1977). The essence of social learning theory further argues that employees learn how to behave by observing what other people in the same environment are doing which include co-workers and their supervisors/leaders. A plausible explanation would be that employees will behave safely when they learn that other people who are doing so will avoid from getting injured or accident while at work. In this context, co-workers are seen as a significant referent other from which employees learn what should and should not be done. The idea of imitating co-worker behaviour is grounded on the need to be socially accepted by others within a group. Hence, the employees learn through socialization process to institutionalize the group norms in order to be accepted.

Secondly, the argument provided by Jiang et al. (2010), where the term descriptive norms was introduced. It refers to what is done, are beliefs and perception about what is actually done by most others in one's social group, determine colleagues' safety beliefs, habits and behaviour, which are likely to play important role in workplace safety. Furthermore, in the context of workplace safety, the idea that co-workers can influence other people's safety behaviour signifies the role of co-workers as an important agent of safety climate at the group level (Brondino et al., 2012). This is because according to Roberts and Geller (1995), a person's co-workers are the ones most likely to be present when a work process warrants certain safety precautions.

Thirdly, besides being a role model for others, co-workers also provide social support to others. In the context of safety, this means that co-workers will encourage other employees to behave safely at work and to provide guidance to the others. They will also watch other employees' back to ensure that everyone will be safe while at work. This is further supported by Brondino et al., (2012), where they stressed that co-workers offer information, show behavioural support for desired practices while discouraging others and might shape their co-workers' roles through offering lateral mentoring. The concept in which co-workers provide support for each other with regards to safety issue is called active caring, which refers to "an ultimate goal in occupational safety, namely that employees care enough about the safety of their co-workers to act accordingly.

5.3.3 Supervisor Safety with Compliance Safety Behavior

As mentioned above the current study found that supervisor safety is significant in explaining the variance in compliance with safety behaviour. The findings of the current study is consistent with previous studies in different setting (Kelloway et al., 2006; Weick & Sutcliffe, 2007). For example Mullen et al., (2011) found similar outcome when examining young and older healthcare employees. The results also appear to be in a similar fashion when the concepts were examined among oil company employees at Norway (Dahl & Olsen, 2013).

There are several plausible explanations for the significant relationship to emerge. Firstly, supervisor's behaviour plays an important factor in determining employee behaviour and attitude at work in that supervisors play a leadership role at work. Secondly, leaders that are concerned about the safety of their workers could reduce occupational injuries and accidents at work because leaders actively communicate the importance of safety at work (Kelloway et al., 2006) and also emphasized the organizational priorities on workplace safety (Kozlowski & Doherty, 1989; Zohar, 1980). Thirdly, leaders serve as an important role model to employees by behaving safely themselves, employees tend to imitate such behaviour, consistent with social learning theory of Bandura (1977). This is further supported through reports that supervisor support enhanced employees' willingness to report injuries and near misses (Lauver et al., 2009). These explanations further support the findings of the present study.

5.3.4 Management Safety Practices with Compliance with Safety Behavior

The present study hypothesized that management safety practices will be related positively with compliance with safety behavior. Uniquely the study found a negative relationship between management safety practices and compliance with safety behavior. Therefore the hypothesis was rejected. Similar finding was also obtained by Tam and Fung, (1998) in an examination among employees of construction firms in Hong Kong.

There is several plausible explanations to obtain an inverse results as compared to a direct relationship. Firstly, they may be attributable to the non-linear relationship with compliance with safety behavior (Tam & Fung, 1998). Secondly, there is also possibility that the employees are having a perception that some unsafe acts do not result in a workplace accident (Chen & Jin, 2012). Therefore the management could have been emphasizing the importance of workplace safety however it could have not penetrated the mindset of the employees because they are not seeing the number of workplace accidents in their daily work activities. As a result their compliance level would have shown a negative relationship in nature. Thirdly it is likely that the nurses would have viewed management safety as being generic compared to supervisory safety which supplies nurses with communication regarding compliance with safety behavior or advice and assistance on how to perform tasks safely (Snyder, Krauss, Chen, Finlinson, & Huang, 2011). As such supervisor could be viewed as a more suitable individual as compared to management to inculcate safe work practices.

5.3.5 Satisfaction of Safety Programs with Compliance Safety Behavior

The study hypothesized that satisfaction with safety programmes will be significantly related to compliance with safety behaviour. As hypothesized the results indicated significant relationship. The present study is consistent with previous similar attempts by researchers in the field of safety and health (Gyekye, 2005, 2006; Gyekye & Salminen, 2007). For example, Cooper and Phillips (2004) where they found satisfaction with safety programs significantly explained the patterns in safety performance/behaviour among production plant employees in the US.

There are several plausible explanation of such result obtained. Firstly, employees who perceive safety programs and interventions instituted by management are effective and useful in reducing work-related accidents and injuries. Secondly those who acknowledge their satisfaction towards the safety programs are likely to institutionalize the values and philosophy embedded in them, which will consequently lead to enhanced safety behaviour (Gyekye, 2006). Satisfactory and effective safety programs, in other words, help reinforce their understanding on the need to behave safely at work. Thirdly, satisfaction on the safety initiatives would have made the safety culture more observable which in return could result in better compliance of safety behaviour (O'Toole, 2002).

5.3.6 Moderating Effect of Age on the Relationship between Safety Management Practices and Compliance with Safety Behavior

The study hypothesized that age would moderate the relationship between safety management practices and compliance with safety behaviour. The results indicate that neither of the relationship between dimension of safety management practices and compliance with safety behaviour was moderated by age of the nurses. The finding of the present study is at some extend is consistent with some previous studies (Dabholkar, Bobbitt, & Lee, 2003; Dean, 2008; Phang et al., 2006; Weijters, Rangarajan, Falk, & Schillewaert, 2007) that examined the moderating effect of age against other work outcome. In this context it could be argued that the role of age in the relation between safety management practices and compliance with safety behaviour is more complex than just a stronger reaction of younger or older nurses to safety behaviour compliance (Bal et al., 2011). Future studies are needed to further strengthen this claim. Secondly, the non-significant moderating effect could be attributed to different motivations among the nurses (Gil-Saura, Ruiz-Molina, & Calderón-García, 2010). While in the case of younger nurses would be risk takers may be behind the decision to less compliance in terms of safety in spite of feeling safety is an important aspect at work, for older nurses family aspects and maturity level may be interfering with complying to safety behaviour. Further research should be conducted in order to determine the underlying motivations for these differences across age groups.

5.4 Implications of the Research

The findings of the current study have several pertinent implications both to practice and theory. The first section will discuss the implications for practice, while the second section will detail the theoretical implications.

5.4.1 Managerial Implications

This study sheds some light on the effective safety management practices in general, and workplace safety and safety behaviour in particular. First of all, the current findings indicated that safety program factor has a stronger effect than supervisor safety and co-worker safety. As higher level of employees' satisfaction on safety programs are related to safety behaviour, organization should find ways to promote safety programs awareness among employees. One possible role of safety program in enhancing safety compliance in the workplace could be address by incorporating assessments of safety program, supervisor safety and co-worker safety into safety monitoring systems. This approach will provide a more complete assessment not only on the effectiveness of workplace safety practices, but also of the entire safety management and organizational set up.

Secondly, the findings stipulate that employees can enhance their compliance with safety behaviour at work by investing more in the safety training and knowledge program. This approach will develop positive attitudes, commitment and involvement

culture from all level of employees at the workplace especially from superior managers and co-workers in building safety work environment (Simard & Marchand, 1995). As a result, employees are more likely to understand the safety management policies and procedures, and have a more complete picture of the significance role of workplace safety behavior.

Finally, in order to develop and design effective workplace safety interventions strategies, it is important for managers to have a clear understanding of how workplace safety factors influence individual safety behaviour. The current study found that workplace safety factors (safety programs, co-worker support and supervisors support) were significant predictive of safety behaviour, but the process of managing and implementing total safety management is more crucial (Zohar, 2000). Thus, whilst workplace safety emerges as importance factors, safety management interventions need to focus on how organizational factors and individual factors could influence safety behaviour, as well as improving safety policy and procedures in health care sector.

5.4.2 Theoretical Implications

Several implications for theoretical contributions may be drawn from the study regarding workplace safety practices and compliance with safety behaviour. Firstly, findings on the main effects of this study have extended beyond findings from other previous study, and thus have contributed to new information to the body of knowledge in safety behaviour literature. First of all, the current study demonstrates the influence of co-

worker safety, supervisor safety and safety programs (policies) on compliance with safety behaviour, and the theoretical justification therefore needs to be revisited in order to further understand the safety behavior especially amongst nurses in healthcare sector. This finding shows that individual, team and organization factors are the basic source of developing safety culture in the workplace. Consistent with behavior based safety (BBS) underlying premise, which emphasizes that employees, co-worker and supervisors need to take an ownership of their safety as well as unsafe behaviors (Kaila, 2006). Empirical research indicates that co-worker and supervisors support have an important role in safety behaviour particularly in 'high risk organizations' (Natarajan, 2006; Yule et al., 2007). In this context, co-worker and supervisors should play significant roles in the accident prevention process by transferring the elements of workplace safety culture to members of the workforce. Similarly, the safety programs also could be used as a BBS effects by measuring safety climate or safety behaviour before and after safety programs implementation for understanding change in safety performance (Kaila, 2006; Simard & Marchand, 1995).

In addition, this finding shows further evidence on the role of management commitment in workplace safety practices. Despite the disagreement outlined regarding this role, management teams, particularly in terms of supervisor involvement in safety development programs, their role and commitment could not be denied (Simard & Marchand, 1994; Yule et al., 2007). This is because a high level of management commitment to safety was associated with low accident rates(Salminen, Gyekye, &

Ojajärvi, 2013), and was a prerequisite of successful initiates aimed at improving the state of safety in organization (Natarajan, 2006).

In conclusion, the current research findings provide valuable evidence regarding the relative impact of workplace safety dimensions on safety behaviour. It can thus be considered an extension of the traditional influence of workplace safety models on safety behavior. The applied use of workplace safety behaviour is crucial in managing the attitudes of management and workforce toward safety behaviour, and thus should improve an organization's safety climate and ultimately their safety performance.

5.5 Directions for Future Research

This research also points to some future research directions that can help further understand the phenomenon of interest especially in workplace safety behaviour. Firstly, the findings revealed that only three dimensions of workplace safety (co-worker support, supervisor support, and safety programs) were signficantly related to safety behaviour, further research attention should be directed towards possible direct effects of other organizational factors, and also towards the role of mediators. Despite the quantity of research that has investigated the mechanisms by which workplace safety scale affects compliance with safety behaviour (Salminen et al., 2013; Yule et al., 2007), there are surprisingly few high quality, primary analytical studies that have explored the differential and combined effects of workplace safety scale, individual and organizational factors on safety compliance in healthcare sector.

Secondly, another direction for further research is to study the antecedents and outcomes of safety behaviour through longitudinal data. Longitudinal research would strengthen literature on safety behaviour by investigating how safety behaviour is developed among employees over time, and whether the effects of safety behaviour on work outcomes would diminish of strengthen over time. Thus, collection of longitudinal data is likely to be helpful in addressing these issues.

5.6 Limitations of the Research

The study is limited by its reliance on self-reported instruments. The main limitation of self-reported is that there are numbers of potential validity problems associated with it. Furthermore, research participants may not be able to provide the level of detail, or use the concepts, that the researcher is interested in. Thus, the findings may be distorted by participants' desire to respond in a consistent manner (Aadahl & Jorgensen, 2003). However, self-reported measures have previously been effectively used in workplace safety research and safety surveys (Salminen et al., 2013). This is because it gives researcher the participants' own views directly, and it gives access to phenomenological data, which are unobtainable in any other way.

Another limitation is the data for the study was collected at a single point in time. The cross-sectional nature of the data prevents causal inferences, and the data can only supply a "snapshot" picture of the workplace safety and safety behaviour of the sample.

In order to prove causality, one must show temporal precedence that can only be done with data collected at least at two different points in time. In addition, the use of Partial Least Squares (PLS) path modelling technique, in itself, cannot provide evidence about causation. However, PLS is powerful technique that allows measurement model parameters to be measured effectively (Akter, D'Ambra, & Ray, 2010; Monecke & Leisch, 2012). By applying this technique, it enabled researcher to test a series of hypotheses that were consistent with a causal model.

5.7 Conclusion

In summary, the purpose of this study was to test the influence of workplace safety practices on safety compliance behaviour in hospital organizations in Malaysia, as measured by the five safety dimensions of Hayes et al. (1998). Despite the limitations discussed previously, this study has the potential to make a significant contribution to safety research and practice. The findings on the significant influence of workplace safety dimensions (co-worker safety, supervisor support and safety programs) on safety compliance demonstrates the importance of workplace safety research, and the need for organizations to provide safety and conducive working environment, particularly in healthcare sector in Malaysia.

References

Aadahl, M., & Jorgensen, T. (2003). Validation of new self-report instrument for measuring physical activity. *Medicine and Science in Sports and Exercise, 1*(3), 1196-1202.

Agnew, C., Flin, R., & Mearns, K. (2013). Patient safety climate and worker safety behaviours in acute hospitals in Scotland. *Journal of Safety Research, 45*, 95-101.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall.

Akter, S., D'Ambra, J., & Ray, P. (2010). *User perceived services quality of mHealth services in developing countries.* Paper presented at the Eighteen European Conference on conference on Information Systems, Pretoria, South Africa.

Alavosius, M. P., & Sulzer-Azaroff, B. (1986). The effects of performance feedback on the safety of client lifting and transfer. *Journal of Applied Behavior Analysis, 19*, 261-267.

Alhemood, A. M., Genaidy, A. M., Shell, R., Gunn, M., & Shoaf, C. (2004). Towards a Model of Safety Climate Measurement. *International Journal of Occupational Safety and Ergonomics (JOSE), 10*(4), 4, 303–318.

Ali, H., Abdullah, N., & Subramaniam, C. (2009). Management practice in safety culture and its influence on workplace injury an industrial study in Malaysia. *Disaster Prevention and Management, 18*(5), 470-477.

Amato, S., Esposito, V. V., & Tenenhaus, M. (2005). *A global goodness-of-?tindex for PLS structural equation modeling*: HEC Schoolof Management, France.

Aminuddin, M. (2007). *Malaysian Industrial Relations and Employment Law* (6th ed.). Kuala Lumpur, Malaysia: McGraw-Hill Book Co.

Arboleda, A., Morrow, P. C., Crum, M. R., & Shelley II, M. C. (2003). Management practices as antecedents of safety culture within the trucking industry: similarities and differences by hierarchical level. *Journal of Safety Research, 34*, 189–197.

Arezes, P. M., & Miguel, A. S. (2008). Risk perception and safety behaviour: A study in an occupational environment. *Safety Science, 46*(6), 900-907.

Austin, H. R. (2003). Transactive memory in organizational groups: The effects of content, consensus, specialization, and accuracy on group performance. *Journal of Applied Psychology, 88*, 866-878.

Bal, P. M., Lange, A. H. d., Ybema, J. F., Jansen, P. G. W., & Velde, M. E. G. v. d. (2011). Age and Trust as Moderators in the Relation between Procedural Justice and Turnover: A Large-Scale Longitudinal Study. *Applied Psychology: An International Review, 60*(1), 66–86.

Bandura, A. (1977). *Social Learning Theory*. Englewood Cliff, NJ: Prentice-Hall.

Barclay, D., Thompson, R., & Higgins, C. (1995). The Partial Least Squares (PLS) Approach to Causal Modeling: Personal Computer Adoption and Use an Illustration. *Technology Studies, 2*(2), 285-309.

Bartlett, J. E., Kotrlik, J. W., & Higgins, C. C. (2001). Organizational research: Determining appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal, 19*(1), 43-50.

Basha, S. A., & Maiti, J. (2013). Relationships of demographic factors, job risk perception and work injury in a steel plant in India. *Journal of Safety Science, 51*(1), 374-381.

Bertolino, M., Truxillo, D. M., & Fraccaroli, F. (2011). Age as moderator of the relationship of proactive personality with training motivation, perceived development from training, and training behavioral intentions. *Journal of Organizational Behavior, 32*, 248-263.

Blau, P. M. (1964). *Exchange and power in social life*. New York: Wiley.

Boden, L. I., Sembajwe, G., Tveito, T. H., Hashimoto, D. M., Hopcia, K., Kenwood, C., et al. (2011). Occupational Injuries Among Nurses and Aides in a Hospital Setting. *American Journal of Industrial Medicine `, 55*(2), 117-126.

Bohrnstedt, G. W. (1970). Reliability and validity assessment in attitude measurement. In G. F. Summers (Ed.), *Attitude Measurement*. Chicago, IL: Rand McNally.

Borman, W. C., & Motowidlo, S. J. (1993). Expanding the criterion domain to include elements of contextual performance. In N. Schmitt & W. Borman (Eds.), *Personnel selection in organizations* (pp. 71-98). New York, NY: Jossey-Bass.

Brondino, M., Silva, S. A., & Pasini, M. (2012). Multilevel approach to organizational and group safety climate and safety performance: Co-workers as the missing link. *Safety Science, 50*(9), 1847-1856.

Bryman, A., & Bell, E. (2007). *Business research methods* (2nd ed.). Oxford: University Press.

Burt, C. D. B., Sepie, B., & McFadden, G. (2008). The Development of a Considerate and Responsible Safety Attitude in Work Teams. *Safety Science, 46*, 79-91.

Caponecchia, C., & Shiels, I. (2011). Perceptions of personal vulnerability to workplace hazards in the Australian construction industry. *Journal of Safety Research, 42*, 253-258.

Chen, Q., & Jin, R. (2012). Safety4Site commitment to enhance jobsite safety management and performance. *Journal of Construction Engineering and Management, 138*(4), 509-519.

Cheyne, A., Oliver, A., Tomas, J. M., & Cox, S. (2002). The architecture of employee attitudes to safety in the manufacturing sector. *Personnel Review, 31*(5-6), 649–670.

Chin, W. W. (1998). Issues and opinion on structural equation modelling. *MIS Quarterly, 22*(1), vii–xvi.

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (1996). *A partial least squares latent variable modelling approach for measuring interaction effects: Results from a Monte Carlo simulation study and voice*

mail emotion/adoption study. Paper presented at the 17th International Conference on Information Systems, Cleveland, OH.

Chin, W. W., & Newsted, P. R. (1999). Structural equation modelling analysis with small samples using partial least squares. In R. H. Hoyle (Ed.), *Statistical strategies for small sample research (*Thousand Oaks, CA: Sage.

Chow, W. S., & Chan, L. S. (2008). Social network, social trust and shared goals in organizational knowledge sharing. *Information & Management, 45*(7), 458-465.

Chowdhury, S., & Endres, M. L. (2010). The Impact of Client Variabilty in Nursing on Occupational Strain and Injury: The Cross-Level Moderating Effect of Safety Climate. *Academy of Management Journal, 53*, 182–198.
Churchill, G. A. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. *Journal of Marketing Research, 16*, 64–73.
Cigularov, K. P., Chen, P. Y., & Rosecrance, J. (2010). The effects of error management climate and safety communication on safety: A multi-level study. *Accident Analysis and Prevention, 42*, 1498-1506.
Clarke, S. (1999). Perceptions of organizational safety: Implications for the development of safety culture. *Journal of Organizational Behaviour, 20*, 185-198.
Clarke, S. (2006a). The relationship between safety climate and safety performance: A meta-analytic review. *Journal of Occupational Health Psychology, 11*(4), 315-327.
Clarke, S. (2006b). Safety climate in an automobile manufacturing plant
The effects of work environment, job communication and safety attitudes on accidents and unsafe behaviour. *Personnel Review, 35*(4), 413-430.
Cloutier, E., David, H., & Duguay, P. (1998). Accident indicators and profiles as a function of the age of female nurses and food services workers in the Québec health and social services sector. *Safety Science, 28*(2), 111-125.
Cohen, A., Smith, M., & Cohen, H. (1975). *Safety program practices in high versus low accident rate companies- and interim report* (No. 75-185). Cincinnati: National institute for Occupational Safety and Health: U.S. Department of Health Education and Welfare.
Compeau, D. R., Higgins, C. A., & Huff, S. (1999). Social cognitive theory and individual reaction to computing technology: A longitudinal study. *MIS Quarterly, 23*(2), 145-158.
Cooper, M. D., & Phillips, R. A. (2004). Exploratory analysis of the safety climate and safety behavior relationship. *Journal of Safety Research, 35*, 497-512.
Corcoran, W. R. (2002). Lessons to be Learned from a Near Miss Loss of Coolant Accident. *ANS Transactions, 87*, 40-41.
Cox, T. H., & Blake, S. (1991). Managing cultural diversity: Implications for organizational competitiveness. *Academy of Management Executive, 5*(3), 45-56.
Dabholkar, P. A., Bobbitt, L. M., & Lee, E.-J. (2003). Understanding Consumer Motivation and Behavior Related to Self-Scanning in Retailing: Implications for Strategy and Research on Technology-Based Self-Service. *International Journal of Service Industry Management,", 14*(1), 59-95.
Dahl, Ø., & Olsen, E. (2013). Safety compliance on offshore platforms: A multi-sample survey on the role of perceived leadership involvement and work climate. *Safety Science, 54*, 17-26.
Davis, D. L. (2000). *Business research for decision making* (5 ed.). Pacific Grove:CA: Duxbury Thomson Learning.
Dean, D. H. (2008). Shopper age and the use of self-service technologies. *Managing Service Quality, 18*(3), 225-238.
Diaz, R., & Cabrera, D. (1997). Safety climate and attitude as evaluation measures of organisational safety. *Accident Analysis and Prevention, 29*(5), 643–650.

Donald, I., & Young, S. (1996). Managing safety: an attitudinal-based approach to improving safety in organizations. *Leadership & Organization Development Journal, 17*(4), 13 - 20.
Ebrahimi, H., & Khosravi, A. (2007). Needlestick Injuries among Nurses. *Journal of Research in Health Sciences, 7*(2), 56-52.
Erkal, S. (2010). Behaviors of Students Towards Safety Measures to Prevent School Accidents. *Healthmed, 6*(6), 1974-1981.
Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*. Akron, OH: University of Akron Press.
Flannery, D. J., Singer, M. I., & Wester, K. (2003). Violence, coping, and mental health in a community sample of adolescents. *Violence and victims, 18*, 403-418.
Flin, R., Mearns, K., O'Connor, P., & Bryden, R. (2000). Measuring safety climate: identifying the common features. *Safety Science, 34*, 177-192.
Folkard, S. (2008). Shift work, safety, and aging. *Chronobiol Int, 25*(2&3), 183-198.
Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18*, 39-50.
Fowler, F. J., Gallagher, P. M., Stringfellow, V. L., Zaslavsky, A. M., Thompson, J. W., & Cleary, P. D. (2002). Using telephone interviews to reduce nonresponse bias to mail surveys of health plan members. *Medical Care, 40*, 190 – 200.
Fugas, C. S., Meliá, J. L., & Silva, S. A. (2011). The “is” and the “ought”: How do perceived social norms influence safety behaviors at work? *Journal of Occupational Health Psychology, 16*(1), 67-79.
Gaba, D. M. (2001). Structural and Organizational Issues in Patient Safety: A Comparison of Health Care to Other High-Hazard Industries. *California Management Review, 43*, 83–102.
Garland, R. (1991). The mid-point on a rating scale: Is it desirable? *Marketing Bulletin, 2*(May), 66-70.
Gefen, D., & Straub, D. (2005). A Practical Guide to Factorial Validity using PLS-Graph: Tutorial and Annotated Example. *Communications of the AIS, 16*, 91-109.
Geller, E. S. (2004). Assessing SH&E research: Key principles and practical strategies improve understanding. *Professional Safety, 49*(9), 22-29.
Geller, E. S., & Wiegand, D. M. (2005). People-based safety: Exploring the role of personality in injury prevention. *Professional Safety., 50*(12), 28-36.
Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research, 25*(2), 186-192.
Gershon, R. R., Conrad, B., Murphy, L., Vlahov, D., & Kelen, G. (1995). Review of accidents/injuries among emergency medical services workers in Baltimore, Maryland. *Prehospital and Disaster Medicine, 10*(1), 14–18.
Gevers, J. K. M. (1983). Worker participation in health and safety in the EEC: The role of representative institutions. *International Labour Review, 122*(4), 411-428.
Gil-Saura, I., Ruiz-Molina, M.-E., & Calderón-García, H. (2010). Retail IT and customer loyalty: The moderating role of customer age. *Journal of Retail and Leisure Property, 9*(4), 357-371.
Goetsch, D. L. (2008). *Occupational Safety and Health for Technologists,*

Engineers and Managers (6th ed.). New Jersey: Pearson Education Inc.
Goodrum, P., & Gangwar, M. (2004). The Effectiveness of Safety Incentives in Construction. *ASSE Journal of Professional Safety, July*, 24-34.
Götz, O., Liehr-Gobbers, K., & Krafft, M. (2010). Evaluation of structural equation models using the Partial Least Squares (PLS) approach. In V. Esposito Vinzi, W. W. Chin, J. Henseler & H. Wang (Eds.), *Handbooks of Computational Statistics Series* (Vol. ll). London, New York: Springer.
Griffin, M. A., & Neal, A. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge and motivation. *Journal of Occupational Health Psychology, 5*(3), 347-358.
Guastello, S. J. (1992). Accidents and stress-related health disorders among bus operators: Forecasting with catastroprephe theory. In J.C. Quick, L.R. Murphy & J. J. Hurrell (Eds.), *Stress and well-being at work* (pp. 252–269). Washington, DC:: American Psychological Association.
Guastello, S. J., & Guastello, D. D. (1988). *The Occupational Hazards Survey: Second edition manual and case report*. Milwaukee, WI: Guastello & Guastello.
Gyekye, S. A. (2005). Workers' Perceptions of Workplace Safety and Job Satisfaction. *International Journal of Occupational Safety and Ergonomics, 11*(3), 291-302.
Gyekye, S. A. (2006). Workers' Perceptions of Workplace Safety:
An African Perspective. *Workers' Perceptions of Workplace Safety: An African Perspective, 12*(1), 31-42.
Gyekye, S. A., & Salminen, S. (2007). Workplace safety perceptions and perceived organizational support: Do supportive perceptions influence safety perceptions? *International Journal of Occupational Safety and*
Ergonomics., 13, 189-200.
Gyekye, S. A., & Salminen, S. (2009). Educational status and organizational safety climate: Does educational attainment influence workers' perceptions of workplace safety? *Safety Science, 47*, 20-28.
Haines, I. V. Y., Merrheim, G., & Roy, M. (2001). Understanding the Reactions to Safety Incentives. *Journal of Safety Research, 32*(1), 17-30.
Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5 ed.). Upper Saddle, NJ: Prentice-Hall.
Hair, J. F., Black, W. C., Babin, B., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate Data Analysis: A Global Perspective*. New Jersey, USA: Pearson Education Inc.
Hale, A. R., Heming, B. H. J., & Carthey, J. (1997). Modeling of safety management systems. *Safety Science, 26*(1-2), 121-140.
Halinski, R. S., & Feldt, L. S. (1970). The selection of variables in multiple regression analyses. *Journal of Educational Measurement., 7*(3), 151-158.
Hansen, L. O., Williams, M. V., & Singer, S. J. (2011). Perceptions of hospital safety climate and incidence of readmission. *Health Services Research, 46*(2), 596-616.
Hayes, B. E., Perander, J., Smecko, T., & Trask, J. (1998). Measuring Perceptions of Workplace Safety: Development and Validation of the Work Safety Scale. *Journal of Safety Research, 29*(3), 145–161.

Henseler, J., Horváth, C., Sarstedt, M., & Zimmermann, L. (2010). A cross-cultural comparison of brand extension success factors: A meta-study. *Journal of Brand Management, 18*(1), 5-20.

Hinze, J. (2002). Safety incentives: Do they reduce injuries?". *Practice Periodical on Structural Design and Construction, 7*(1), 81-85.

Hofmann, D. A., & Mark, B. (2006). An Investigation of the Relationship between Safety Climate and Medication Errors as Well as Other Nurse and Patient Outcomes. *Personnel Psychology, 59*(4), 847–869.

Hofmann, D. A., & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviors and accidents. *Personnel Psychology, 41*, 307– 339.

Høivik, D., Tharaldsen, J. E., Baste, V., & Moen, B. (2009). What is most important for safety climate: the company belonging or the local working environment? – a study from the Norwegian offshore industry. *Safety Science, 47*, 1324–1331.

Homans, G. (1961). *Social Behavior*. New York: Harcourt, Brace & World.

Hughes, A., & Gilmour, N. (2010). Attitudes and Perceptions of Work Safety among Community Mental Health Workers. *North American Journal of Psychology, 12*(1), 129-140.

Inness, M., Turner, N., Barling, J., & Stride, C. B. (2010). Transformational leadership and employee safety performance: A within-person, between-job design. *Journal of Occupational Health Psychology, 15*, 279-290.

Jiang, L., Yu, G., Li, Y., & Li, F. (2010). Perceived colleagues' safety knowledge/behavior and safety performance: Safety climate as a moderator in a multilevel study. *Accident Analysis and Prevention, 42*, 1468-1476.

Johnstone, R., Quinlan, M., & Walters, D. (2005). Statutory OHS Workplace Arrangements for the Modern Labour Market. *Journal of Industrial Relations, 47*(1), 93-116.

Kaila, H. L. (2006). Behaviour based safety in organizations. *Indian Journal of Occupational and Environmental Medicine, 10*(3), 102-112.

Kapp, M. B. (2012). The Liability Environment for Physicians Providing Nursing Home Medical Care: Does It Make a Difference for Residents? *Elder Law Journal, 16*(2), 249-293.

Katz, R. (1982). The effects of group longevity on project communication and performance. *Administrative Science Quarterly, 27*, 81-104.

Kelloway, K., Mullen, J. E., & Francis, L. (2006). Injuring your leadership: How passive leadership affects employee safety. *Journal of Occupational Health Psychology, 11*(1), 76-86.

Kirwan, B. (1998). Safety management assessment and task analysis—a missing link? In A. Hale & M. Baram (Eds.), *Safety Management: The Challenge of Change* (pp. 67–92). Oxford: Elsevier.

Kozlowski, S. W. J., & Doherty, M. L. (1989). Integration of climate and leadership: Examination of a neglected issue. *Journal of Applied Psychology, 74*, 546–553.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement, 30*, 607-610.

Laflamme, L. (1996). Age-related accident ratios in assembly work: A study of female assembly workers in the Swedish automobile industry. *Safety Science, 23*(1), 27–37.

Larsson, S., Pousette, A., & Törner, M. (2008). Psychological Climate and Safety in the Construction Industry - Mediated Influence on Safety Behaviour. *Safety Science, 46*, 405–412.
Lauver, K. J., Lester, S. W., & Le, H. (2009). Supervisor Support and Risk Perception: Their Relationship with Unreported Injuries and Near Misses. *Journal of Managerial Issues, 21*(3), 327-343.
Lohmöller, J.-B. (1989). *Latent variable path modelling with partial least squares*. Heidelberg, Germany: Physica Verlag.
Lu, C., & Tsai, C. (2010). The effect of safety climate on seafarers' safety behaviors in container shipping. .
Accident Analysis & Prevention, 42(6), 1999–2006.
Lund, I. O., & Rundmo, T. (2009). Cross-cultural comparisons of traffic safety, risk perception, attitudes and behaviour. *Safety Science, 47*(4), 547-553.
Mearns, K., & Flin, R. (1999). Assessing the state of organizational safety – culture or climate? *Current Psychology, 18*(1), 5–17.
Mearns, K., Whitaker, S. M., & Flin, R. (2003). Safety climate, safety management practice and safety performance in offshore environments. *Safety Science, 41*, 641– 680.
Miller, D. E., & Kunce, J. T. (1973). Prediction and statistical overkill revisited. *Measurement and Evaluation in Guidance, 6*(3), 157-163.
Ministry of Health. (2010). Guidelines on Chemical Management in Health Care Facilities.
Ministry of Human Resources, Malaysia.
Monecke, A., & Leisch, F. (2012). semPLS: Structural Equation Modeling using Partial Least Squares. *Journal of Staistics Software, 48*(3), 1-32.
Mullen, J. E. (2005). *Safety-specific transformational leadership: An experimental study.* Saint Mary's University, Halifax, Canada.
Mullen, J. E., Kelloway, E. K., & Teed, M. (2011). Inconsistent leadership as a predictor of safety behaviour. *Work & Stress, 25*, 41-54.
Murphy, L. R., Sturdivant, K., & Gershon, R. M. (1993). *Organizational and employee characteristics predict compliance with universal precautions.* Paper presented at the Annual meeting of the American Psychological Society, Chicago, IL.
Natarajan, R. N. (2006). Transfering best practices to healthcare: opportunities and challenges. *TQM Magazine, 18*(6), 572-582.
Neal, A., & Griffin, M. (2006). A study of the lagged relationships among safety climate, Safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology, 19*(4), 946–953.
Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organisational climate on safety climate and individual behaviour. *Safety Science, 34*, 99-109.
Nsubuga, F. M., & Jaakkola, M. S. (2005). Needle stick injuries among nurses in sub Saharan Africa. *Tropical Medicine & International Health, 10*(8), 773-781.
O'Toole, M. (2002). The relationship between employees' perception of safety and organisational culture. *Journal of Safety Research, 33*, 231–243.
Pallant, J. (2007). *SPSS Survival Manual: A step-by-step guide to data analysis using SPSS for Windows* (3rd ed.). New York: Open University Press.

Parboteeah, K. P., & Kapp, E. A. (2008). Ethical climates and workplace safety behaviors: An empirical investigation. *Journal of Business Ethics, 80*(3), 515-529.
Parker, S. K., Axtell, C., & Turner, N. A. (2001). Designing a safer workplace: Importance of job autonomy, communication quality, and supportive supervisors. *Journal of Occupational Health Psychology, 6*, 211–228.
Parwoll, M., & Wagner, R. (2012). *The Impact of Missing Values on PLS Model Fitting.* Paper presented at the 34th Annual Conference of the German Classification Society (GfKl), Karlshure.
Pedersen, L. M., & Kines, P. (2011). Why do workers work safely? Development of safety motivation questionnaire scales? *Safety Science Monitor, 15*(1), 1-10.
Petersen, D. (1989). *Safe behavior reinforcement.* Goshen, NY: Aloray.
Peterson, D., & Perry, R. W. (1999). The impacts of disaster exercises on participants. *Disaster Prevention and Management, 8*, 241-254.
Phang, C. W., Sutanto, J., Kankanhalli, A., Li, Y., Tan, B. C. Y., & Teo, H. H. (2006). Senior Citizens' Acceptance of Information Systems: A Study in the Context of E-Government Services. *IEEE Transactions on Engineering Management, 53*(4), 555-569.
Pirker, C. (2009). *Statistical Noise or Valuable Information - The Role of Extreme Cases in Marketing Research*. New Jersey: Springer.
Probst, T. (2002). Layoffs and tradeoffs: production, quality, and safety demands under the threat of a job loss. *Journal of Occupational Health Psychology, 7*, 211–220.
Reason, J. (1990). *Human Error*. Cambridge, UK: Cambridge University Press.
Roberts, D. S., & Geller, E. S. (1995). An "actively caring" model for occupational safety: A field test. *Applied and Preventive Psychology, 4*, 53-59.
Rogers, A. E., Hwang, W. T., Scott, L. D., Aiken, L. H., & Dinges, D. F. (2004). The Working Hours of Hospital Staff Nurses and Patient Safety. *Health Aff (Millwood), 23*(4), 202-212.
Roscoe, J. T. (1975). *Fundamental research statistics for the behavioral sciences* (2nd ed.). New York: Holt, Rinehart, and Winston.
Rundmo, T. (1992). Risk perception and safety on offshore petroleum platforms—part II: Perceived risk, job stress and accidents. *Safety Science, 15*, 53– 68.
Rundmo, T. (1999). Perceived risk, health and consumer behaviour. *Journal of Risk, 2*, 187–200.
Rundmo, T., & Hale, A. R. (2003). Managers' attitudes toward safety and accident prevention. *Safety Science, 41*, 557–574.
Sadhra, S., Beach, J. R., Aw, T.-C., & Sheikh-Ahmed, K. (2001). Occupational health research priorities in Malaysia: A Delphi study. *Occupational and Enviromental Medicine, 58*, 426-431.
Salminen, S. (2004). Have young workers more injuries than older ones? An international literature review. *Journal of Safety Research, 35*(5), 513-521.
Salminen, S., Gyekye, S. A., & Ojajärvi, A. (2013). Individual and Organizational Factors of Safe Behaviour among Ghanaian Industrial Workers. *Engineering Management Research, 2*(1), 98-110.
Schutte, R. (2010). *Safety performance in the construction sector the influence of transformational leadership and the mediating role of safety climate.* Utrecht University.

Scott, L. D., Rogers, A. E., Hwang, W. T., & Zhang, Y. (2006). Effects of critical care nurses' work hours on vigilance and patients' safety. *American Journal of Critical Care, 15*(1), 30–37.

Seidel, E., Habel, U., Kirschner, M. G., R.C. , & Derntl, B. (2010). The impact of facial emotional expressions on behavioral tendencies in women and men. *Journal of Experimental Psychology, Human Perception and Performance, 36*, 500-507.

Sekaran, U. (2003). *Research methods for business: A skill building approach* (4 ed.). NY: John Wiley & Sons, Inc.

Sekaran, U., & Bougie, R. (2010). *Research Methods for Business: A Skill Building Approach*. UK: John Wiley & Sons.

Sharma, S. (1996). *Applied Multivariate Techniques*. New York: John Wiley and Sons, Inc.

Simard, M., & Marchand, A. (1994). The behavior of first-line supervisors in accident prevention and effectiveness in occupational safety. *Safety Science, 17*(3), 169-185.

Simard, M., & Marchand, A. (1995). A multilevel analysis of organizational factors related to the taking of safety initiatives by work groups. *Safety Science, 21*(2), 113-129.

Simonds, R. H., & Shafai-Sahrai, Y. (1977). Factors apparently affecting injury frequency in eleven matched pairs of companies. *Journal of Safety Research, 9*(3), 120-127.

Sinclair, R. C., Smith, R., Colligan, M., Prince, M., Nguyen, T., & Stayner, L. (2003). Evaluation of safety training program in the three food service companies. *Journal of Safety Research, 34*, 547-558.

Singer, S., A. Falwell, D. Gaba, & Baker, L. (2008). Hospital Patient Safety Climate: Variation by Management Level. *Medical Care, 46*(11), 1149–1156.

Siu, O.-l., Phillips, D. R., & Leung, T. (2004). Safety climate and safety performance among construction workers in Hong Kong: the role of psychological strains as mediators. *Accident Analysis and Prevention,. 36*, 359-366.

Siu, O.-l., Phillips, D. R., & Leung, T.-w. (2003). Age differences in safety attitudes and safety performance in Hong Kong construction workers. *Journal of Safety Research, 34*(2), 199–205.

Smith, M., Cohen, H., Cohen, A., & Cleveland, R. (1978). Characteristics of successful safety programs. *Journal of Safety Research, 10*(1), 5–15.

Snyder, L. A., Krauss, A. D., Chen, P. Y., Finlinson, S., & Huang, Y. H. (2011). Safety performance: The mediating role of safety control. *Work: A Journal of Prevention , Assessment, & Rehabilitation, 39*, 1-13.

Straub, D., Boudreau, M.-C., & Gefen, D. (2004). Validation Guidelines for IS Positivist Research. *Communications of AIS, 13*, 380-427.

Tam, C. M., & Fung, I. W. H. (1998). Effectiveness of Safety Management Strategies on Safety Management in Hong Kong. *Construction Management and Economics., 16*, 49–55.

Temme, D., Kreis, H., & Hildebrandt, L. (2006). *PLS Path Modeling – A Software Review.* Paper presented at the 35th EMAC-Konferenz.

Tenenhaus, M., Esposito, V. V., Chatelin, Y. M., & Lauro, C. (2005). PLS pathmodeling. *Computational Statistics and Data Analysis, 48*, 159-205.

Thibaut, J., & Kelley, H. H. (1959). *The social psychology of groups*. New York: Wiley.
Trankle, U., Gelau, C., & Metker, T. (1990). Risk perception and age-specific accidents of young drivers. *Accid. Anal. Prev, 22*, 119–125.
Trinchera, L., & Russolillo, G. (2010). *On the use of Structural Equation Models and PLS Path Modeling to build composite indicators* (No. Working Papers No. 30): Macerata University, Department of Studies on Economic Development (DiSSE).
Villanueva, V., & Garcia, A. (2011). Individual and occupational factors related to fatal occupational injuries: a case-control study. *Accident Analysis & Prevention, 43*(1), 123-127.
Vinodkumar, M., & Bhasi, M. (2010). Safety management practices and safety behavior: Assessing the mediating role of safety knowledge and motivation. *Accident Analysis and Prevention, 42*, 2082–2093.
Vredenburgh, A. (2002). Organizational safety: Which management practices are most effective in reducing employee injury rates. *Journal of Safety Research, 33*, 259–276.
Weick, K. E., & Sutcliffe, J. (2007). *Managing the Unexpected: Resilient Performance in an Age of Uncertainty* (2nd ed.). New York: Eiley.
Weijters, B., Rangarajan, D., Falk, T., & Schillewaert, N. (2007). Determinants and Outcomes of Customers' Use of Self-Service Technology in a Retail Setting. *Journal of Service Research, 10*(1), 3-21.
Werts, C. E., Linn, R. L., & Joreskog, K. G. (1974). Interclass Reliability Estimates: Testing Structural Assumptions. *Education and Psychological Measurement, 34*, 25-33.
Wetzels, M., Odekerken-Schroder, G., & Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS Quarterly, 33*(1), 177-195.
Williams, H., Turner, N., & Parker, S. K. (2000). *The compensatory role of transformational leadership in promoting safety behaviours.* Paper presented at the Academy of Management Conference, Toronto.
Yule, S., Flin, R., & Murdy, A. (2007). The role of management and safety climate in preventing risk-taking at work. *International of Risk Assessment and Management, 7*(2), 137-151.
Zhou, Q., Fang, D., & Wang, X. (2008). A method to identify strategies for the improvement of human safety behavior by considering safety climate and personal experience. *Safety Science, 46*(1406–1419).
Zikmund, W. G. (2003). *Business research methods* (7 ed.). Mason, OH: Thompson South-Western.
Zohar, D. (1980). Safety climate in industrial organisations: theoretical and applied implications. *Journal of Applied Psychology, 65*, 96-102.
Zohar, D. (2000). A Group-Level Model of Safety Climate: Testing the Effect of Group Climate on Microaccidents in Manufacturing Jobs. *Journal of Applied Psychology, 85*(4), 587-596.
Zohar, D. (2002). The Effects of Leadership Dimensions, Safety Climate, and Assigned Priorities on Minor Injuries in Work Groups. *Journal of Organizational Behavior, 23*, 75-92.